Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



Drawn & Engraved by R. PAGE.

R. W. DICKSON, M. D.

London, *Published by* Thos Kelly, *17, Paternoster Row, May 1, 1824.*

R-29
2

Improved LIVE STOCK And CATTLE MANAGEMENT.

BY

R. W. DICKSON, M.D. &c.



Illustrated by numerous Engravings taken from Nature (expressly for this Work) by eminent Artists under the immediate direction of the Author.

LONDON

Printed for THOMAS KELLY, *17, Paternoster Row.*

1822.

A

COMPLETE SYSTEM

OF IMPROVED

Live Stock and Cattle Management;

OR,

THE PRACTICAL GUIDE

TO

GENTLEMEN, STORE-MASTERS, FARMERS, AND OTHER KEEPERS OF STOCK,

In perfecting the Breeds and Varieties of the several Kinds of Live Stock,

IN EXPLAINING AND INCULCATING

THE NATURE, PRINCIPLES, AND BEST METHODS OF BREEDING, WEANING, REARING, FEEDING, AND FATTENING THEM; THE MANAGEMENT OF THEIR DIFFERENT PRODUCTS, AND THE MOST SCIENTIFIC MEANS OF CURING THE VARIOUS DISEASES AND ACCIDENTS TO WHICH THEY ARE EXPOSED;

WITH CORRECT DESCRIPTIONS OF THE NUMEROUS BREEDS AND VARIETIES OF EACH SORT, THEIR CHARACTERS, PROPERTIES, USES, AND BENEFITS,

SHORT INTRODUCTORY ACCOUNTS OF THEIR NATURAL HISTORY,

AND PROPER DIRECTIONS FOR TREATING AND MANAGING EACH PARTICULAR KIND:

The whole containing whatever is New, Interesting, and Useful, on this great and important Subject. Together with

The latest practical Facts, Discoveries, and Inquiries,

Which have been made by the most experienced and eminent Breeders, Amateurs, Farmers, and others, in the improving and increasing the Value, Utility, and Profit of every Sort of Domestic Live Stock. Also,

A FULL DISPLAY OF THE VETERINARY ART AND PRACTICE;

The several useful Breeds of DOGS and RABBITS; the Nature, Habits, and proper Management of all Kinds of POULTRY and PIGEONS; the necessary Culture of BEES and FISH;

WITH MUCH OTHER USEFUL AND IMPORTANT INFORMATION ON RURAL PRACTICE AND ECONOMY.

ILLUSTRATED BY A SERIES OF

FINE ENGRAVINGS OF THE MOST IMPROVED ANIMALS OF THE DIFFERENT SORTS,

AFTER DRAWINGS MADE FROM NATURE EXPRESSLY FOR THIS WORK.

BY R. W. DICKSON, M. D.,

Author of "Practical Agriculture;" "The Complete Farmer, or General Dictionary of Agriculture and Husbandry;" and numerous other Works on Rural and Political Economy.

IN TWO VOLUMES.

FELIX QUI POTUIT RERUM COGNOSCERE CAUSSAS.—VIRG.

LONDON: PRINTED FOR THOMAS KELLY, 17, PATERNOSTER-ROW.

MDCCCXXIV.

LONDON:
Printed by WILLIAM CLOWES,
Northumberland-court.

TO

HIS MAJESTY

THE KING,

AND TO

THE PEOPLE OF THE UNITED KINGDOM,

THIS WORK,

AS EXPLAINING AND ENFORCING THE NATURE, PRINCIPLES, AND PRACTICES, WHICH ARE NECESSARY TO BE USED IN IMPROVING AND PERFECTING THE BREEDS AND VARIETIES OF EVERY SORT OF

DOMESTIC LIVE STOCK AND ANIMALS;

AND AS

SHEWING

The Means of more largely increasing and providing the fullest Quantity of the different Kinds of Animal Food, and some other necessary Articles, for the Use of the Community at large, and greatly promoting the Prosperity and Happiness of the Country, Permission being given to have Portrait Figures of different superior Animals of the ROYAL STUD and other Kinds taken, for the purpose of its Illustration,—is humbly inscribed

BY THE AUTHOR.

AUG 17 1945

560029

INTRODUCTION.

THERE are no subjects, probably, in the whole range of rural economy, that have occupied a greater share of attention, or undergone more continued improvement, than those which relate to the nature and management of Live-Stock. The primeval inhabitants of the world had no other wealth than their sheep and cattle. When fathers, therefore, gave their daughters in marriage, they presented with them so many herds, or flocks; and such are the dowries of the present day in Algiers, and in various parts of Arabia. The principal riches of the Romans, also, appear to have been, at an early period, of a similar nature; as *pecunia*, the Latin name for money, seems to have been derived from *pecus*, a word signifying cattle; and it is certain that *peculator*, one who defrauds the public, may be traced to the same origin. In turning over the pages of history, whether sacred or profane, we meet with frequent allusions to property of this description, and discover that pastoral avocations were by no means incompatible with the possession of the highest dignities. In modern times, by the close attention and repeated experiments of different veterinary surgeons, the nature and causes of various diseases in cattle-stock, have been satisfactorily ascertained, and fully investigated; and remedies, equally powerful and appropriate, have been applied with complete success. The breeding and management of the different species have, also, employed the thoughts and pens of persons of the most unquestionable talent; and the unremitting exertions of many distinguished characters have given rise and circulation to numerous improvements, which had been previously hidden or unknown. Many invaluable discoveries have resulted from the determined research and continued support of enlightened individuals; and it must be highly gratifying to cultivators and farmers of every description, that their labours are patronised and encouraged by a Bedford, a Coke, a Parry, a Seabright, a Somerville, a Western, and many others, equally celebrated for their laudable efforts, in promoting the improvement of live-stock in all its varieties.

The great care and attention which have, at all periods, been bestowed upon the breeding and management of all kinds of cattle-stock, by those who were the most capable of appreciating the various benefits which they afford to

mankind, sufficiently prove the importance of the subjects discussed in the following sheets; and, as improvement is still progressively advancing towards perfection, it is presumed, that every additional discovery, information, or suggestion, relating to the breeding, rearing, feeding, and fattening of different animals, or connected with the prevention, or cure, of their respective diseases, will be peculiarly acceptable to breeders, graziers, and farmers, and equally beneficial to the public; in consequence of the vast importance of first-rate stock to individuals, and to mankind in general. It is evident, indeed, that stock-keepers and farmers can derive but little advantage from the various productions of the earth, unless they are perfectly acquainted with the best means of using them for the food of the animals which are kept, and of rendering those animals, by judicious management, the chief sources of their profit. And, as many alterations have recently taken place in the breeds and qualities of live-stock, and a continual demand is made for such stock, either for the purposes of labour, or for the sustenance of mankind, it will be the duty and interest of every land-holder and cultivator to patronise a publication, which, from its practical and beneficial tendency, cannot be too widely diffused through all parts of the country.

In the work now respectfully submitted to the public, the author has endeavoured to combine, in one point of view, all the most useful observations of ancient and modern writers, in regard to the nature, properties, and habits, of cattle, and other kinds of live-stock; together with the most improved practices in rearing and managing them; and the best and most expeditious means of curing the various disorders and accidents to which they are liable; adhering to the regular and simple plan which has been beneficially adopted in other works of a similar tendency. Each animal is introduced by a concise sketch of its natural history, and particular sort; the different and most approved domestic breeds, the mode of treatment which they require, the diseases to which they are incident, and the remedies which should be applied, including some notice of foreign breeds, with original remarks, discoveries, and other useful information, together with the suggestions which have been communicated by different correspondents. And, as none of those sciences which are more immediately or remotely connected with the subject have been neglected or overlooked, but carefully blended with the result of the writer's practical observation and repeated experiments, it is confidently hoped that this work on Live Stock and Cattle Management, may be found a safe and valuable "guide" to store-masters and farmers, in raising, preserving, and improving their stock; and that, whenever animals happen to be diseased, or in a state of deterioration,

in situations where veterinary assistance cannot be readily procured, a careful perusal of the nature and state of certain appearances and derangements, and a proper attention to the remedies prescribed, may gradually instruct the young farmer, or stock-master, in the knowledge and practice of this important art. It may likewise be expected, in many cases, to prove equally beneficial in directing the views and improving the knowledge of the young veterinary practitioner.

It has not been deemed necessary to enter into the long-disputed question relative to the "size" of animals, in view of pecuniary advantage to the farmer, as smallness with fineness, and largeness with a degree of coarseness have been contended for, with equal violence, by their respective supporters, though truth, most probably, lies between the two extremes, and depends almost entirely on the nature of the keep; but in *improved breeds*, larger animals may generally be admitted and employed with greater advantage than under other circumstances. It should also be remarked, that the subject of "offal" has not been materially considered in the following pages, as from the present mode of trial there seems but little difference between that of large or small animals, in any of the varieties of domestic live stock; and it is, therefore, sufficiently obvious, that a series of experiments, entirely different from those at present adopted, are requisite to be made on this head, in order that the question may be satisfactorily decided.

Live Stock consists equally of large and small animals; the former including neat, or black cattle, horses, mules, asses, sheep, goats, and deer; and the latter comprising swine, rabbits, different kinds of poultry, pigeons, and some others: and though under this division some be less esteemed by the farmer than animals of a larger size, yet, under different circumstances, and in many situations, they will be found to afford no little profit to their owners. In order, therefore, to render the present work as complete and useful as possible, both descriptions of live stock have been included, though the greatest portion is, of course, devoted to that division which may be considered the principal, as possessing the greatest interest and importance. In the execution of the whole, the most perfect authorities have been consulted; and those difficulties and intricacies which have, in many instances, obscured the pages of former works on this subject, have, in the present, been cleared away, that the whole might be rendered as clear and explicit as possible; the directions are sufficiently copious, without unnecessary prolixity, and the descriptions and details are couched in language which, to the most simple neat-herd, will be intelligible, and to the enlightened farmer, satisfactory. The correct and masterly engravings which accompany the present publication, contribute at once to its elegance

and utility; as, instead of exhibiting mere pictorial representations of the different animals, they are designed to place the most noted breeds in various points of view, by displaying their bony and muscular structure, the situation of their respective internal parts, and other circumstances, important in themselves, and replete with interest to the reader.

From a review of the researches which have been made,—the facts which have been brought forward,—the directions which have been given,—the remedies which have been prescribed,—and the illustrations which have been introduced in the present work, the author ventures to cherish the pleasing anticipation, that it will not only be favourably received and extensively circulated, but that it will prove a source of incalculable benefit to the public, in improving the practices of the breeders and rearers of all sorts of live stock; so that the increase of animal food for man may, in some measure, keep pace with the increasing population of the country. And if it be duly considered, how greatly and constantly the means of support for the community depends on the collective quantity of such food, provided by the slaughter of cattle-stock:—how far and injuriously the diseases to which they are liable, extend their fatal influence; and how many thousands of such animals are almost lost to mankind on this account; the indispensable necessity and the intrinsic value of a work, having for its immediate object the preservation and improvement of live stock, must be so apparent to every intelligent mind, that even those, who have no personal concern in agricultural pursuits or rural occupations, will be compelled to breathe a wish for its success.

AN

IMPROVED SYSTEM

OF

LIVE STOCK AND CATTLE MANAGEMENT;

WITH THE

MEANS OF PREVENTING AND CURING DISEASES, ACCIDENTS,

&c. &c.

THE improvement of the various breeds of cattle, and the proper management of live stock in general, are subjects of such vast importance, not only to agriculturists, but to the nation at large, that they may be justly ranked among the most useful and valuable branches of the science of rural economy.

Every practical agriculturist, who has had sufficient experience in raising and managing this kind of stock, must be sensible that there is no other species of farming in which an extensive and thorough knowledge of the most improved system of management is so absolutely necessary and indispensable, in order to obtain a return of profit in any degree commensurate with the labour, difficulties, and risk, which it inevitably involves. The period of time consumed by the growth of the animals, necessarily protracts the return of capital expended; and the diseases and accidents to which they are always liable, expose it to peculiar hazard. Yet, notwithstanding these objections, an intelligent breeder and feeder, who duly avails himself of all the advantages which the improved modern system of management presents to him, may, in many situations, reap more profitable returns for his capital, skill, and labour, from this species of farming, than from any other branch of agriculture. For a very considerable portion of these advantages, the country is indebted to the indefatigable efforts of Mr. ROBERT BAKEWELL, who will be long remembered and revered, as the enlightened discoverer of many important inventions and improvements, which he propagated and esta blished by a peculiarly persevering spirit of inquiry and experiment. To the example of this celebrated breeder must also be attributed much of that emulation among practical farmers, which, within a recent period, has extended the trial of many new discoveries, and the investigation of many doubtful theories by the only sure test of experiment; and has thus been the means of advancing this branch of rural art to a degree of systematic perfection, which never was contemplated by our ancestors.

The high prices which celebrity procured for certain peculiar breeds of various kinds of live stock, in consequence of their improved advantages, soon awakened the attention of farmers and breeders, with whom remuneration

for their capital and labour is naturally the first consideration; and a spirit of competition soon becoming general, a great national benefit resulted from individual enterprise, in the increased productiveness of the aggregate stock of the country.

From the period when Mr. Bakewell's name first became popularly connected with Live Stock and Cattle Management, the subject has continued to occupy the attention of all classes of agriculturists. Many noblemen, and other persons of rank and opulence, land proprietors in various parts of the kingdom, have devoted their time and attention to this particular branch of farming; and by a praiseworthy use of their wealth and influence, in regulating, correcting, and familiarizing new principles and methods, or propagating others, the result of more correct experience, have contributed very materially to its improvement.

Under such auspicious circumstances, this most valuable and useful art has been in a state of progressive advancement from its first public announcement to the present time, when its principles have become sufficiently established to assume the consistency of a system.

In performing the task of preparing a practical treatise on this system, for the instruction and benefit of farmers and breeders, the author has been anxious to render it as perfect as diligence and study could enable him, by a careful comparison of all the various theories that have been propagated, with the result of actual and long experience; he has endeavoured to convey the result of his labours in the plainest language, suitable to the subject, and has adopted the plan of treating upon each species and variety separately and distinctively; which, if it occasionally involves redundancies or repetitions, atones for those blemishes by combining the easy reference of a dictionary with the more ample information of a treatise.

Live Stock, in the language of the farmer or storekeeper, comprehends all sorts of domestic animals, including the horse, cow, bull, ox, sheep, goat, deer, and swine; as well as those of the rabbit, pigeon, poultry, and some other species. Beasts of pasture are those quadrupeds of the bull, ox, and cow kind, which chew the cud; they are the most perfect of the ruminant class of animals; and are generally termed,

NEAT CATTLE; or, THE LARGE-HORNED CATTLE.

Whatever difference of opinion may subsist, as to the beauty of the horns, which grow from the heads of bulls, oxen, cows, sheep, and other animals, it is unquestionable, that Nature designed them for something more than ornaments, as they use them for weapons of defence against the attacks of their enemies. There are, however, some disadvantages attending long horns, and, indeed, horns of all descriptions, which will be noticed under the proper head.

BEEVES.

This is a general name given in several districts to oxen, and some other sorts of neat cattle.

BLACK CATTLE.

This term is sometimes applied to neat cattle in general; but is more properly confined to that small hardy breed, mostly of a black colour, which occupies the high or mountainous districts of the more northern parts of the island. The beef of these cattle is generally of a fine grain, well-marbled, and of a good

flavour: but is occasionally spotted with black, even upon the choicest parts, if not made perfectly fat.

There can be no doubt that all sorts of neat cattle originally were wild; but as civilization proceeded, and the arts of cultivation became known, those animals which appeared the best adapted for the purposes of domestication were selected, and gradually rendered subservient to the power of man. According to the celebrated naturalist, Mr. Pennant, the following are the characteristic distinctions of this genus of animals: "Cloven-footed, with or without horns, the horns bending out laterally: eight cutting teeth in the lower jaw, and none in the upper: the skin along the lower side of the neck pendulous; rounded horns, with a large space between their bases." The species of this genus constitute the principal sorts, from which varieties have been produced by intercopulation, and a diversity of soil, food, and climate: and which varieties, whether original or acquired, have been preserved in a permanent state by careful breeders.

The grand specific distinction which naturalists make in neat cattle (independently of the variations caused by climate, or the agency of other causes), is between the Urus and the Bison.

THE URUS, OR COMMON BULL.

This animal, in its natural wild state, exists in temperate climates: it has in general a curled shaggy coat, especially on the forehead; the hair constantly long on the fore quarters, neck, and forehead, and depending from the chin; the neck elevated, thick, and short, with the tail long, the eyes red and fiery, and the horns thick and short. It grows to a large size, the female being larger than the English bull, and is of a black colour. The elevated crest, and lion's mane, are general characteristics of the Urus, or Common Bull: the former mark, especially, is retained to the latest stages of domestication, as is seen occasionally in the Devonshire, Alderney, and some other breeds of domesticated neat cattle. This species is now well established in the temperate and cold climates of the earth, especially throughout America; which has most probably become stocked by importations from Europe.

THE BISON, OR LARGE BULL,

Is a native of hot, but is sometimes met with in cold, regions; and its characteristic mark is a hunch between the shoulders, which, in some of the largest of the species, is of considerable weight; and the flesh possesses an exquisite flavour. In the fore parts it has the same hairy appearance as the urus; the tail and legs are short, the eyes fierce, the forehead large, and the horns extremely wide. These animals are spread over most of the southern parts of the world, but with considerable diversity in respect to size and form. In the island of Madagascar, in Malabar, and other parts of India; in Persia, the Ukraine, Calmuc Tartary, Upper Ethiopia, and Abyssinia, they are of the proper *bison*, or large kind; and in Africa, the higher southern latitudes of India, and some parts of Arabia, they are of the small, or *zebu*, kind; in which the hair is finer, softer, and more glossy, than that of the common cow. Some of the Indian cattle attain a very large size, but are irregular as to the horns; many being entirely without them, and others having very large ones, either branching or pendulous. The oxen of this species are in much requisition for the purpose of drawing carriages, being quick, and frequently of a fine white colour. These cattle have been occasionally imported into this

country, and blended with English breeds. The zebu is a dwarf sort of bison, and has undergone great variations from different causes.

THE MUSK BULL,

Which is found in the interior parts of North America, westward of Hudson's Bay, is most probably a variety produced by an intercopulation of the bison with the common European species, as the flesh of the wild bull of the European continent retains a musky smell. This animal is described as somewhat lower, but more bulky than the deer; the legs short; a small hunch on the shoulders; the hair of a dusky red colour, very fine, and so long as to reach the ground; beneath which the body is covered with an ash-coloured wool, of such exquisite fineness, that stockings have been made of it much finer than silk. The tail, only three inches in length, is covered with long hairs, of which the Esquimaux Indians make caps. The horns are close and large at the base, bending downwards, or turning out at the tips, and are about two feet in length. These animals are very prolific, and their flesh, notwithstanding its musky flavour, is esteemed good and wholesome food.

THE SARLUC, GRUNTING BULL, OR OX,

Is domesticated in Tartary and Thibet, and may be considered to belong to the bison sort, having a hunch between the shoulders, and being capable of generating with that animal. It has, however, one remarkable peculiarity; for, instead of lowing like an ox, it grunts like a hog: it also varies from the bison or zebu in other particulars; the body is covered with very long hairs hanging down below the knees, mostly of a black colour, except on the ridge of the back or mane, which is white. The horns are short, upright, slender at the extremities, and sharp like the zebu's; the tail is similar to that of the horse, but white and bushy, and is held in high estimation in India, where it is used for various purposes. It is sometimes mounted in silver, and forms a brush for driving away flies; occasionally it adorns the ears of an elephant; and at other times, dyed red and formed into tufts, it ornaments the bonnets of the grandees. The sarluc butts, or strikes with its head, like a goat; and in its wild state is very ungovernable.

ORIGIN OF THE DIFFERENT SORTS.

It is evident from the nature of the distinctions of the two races of wild neat cattle, which have been above described, that all the various kinds of such cattle now existing in this or other countries in the domesticated state have originally proceeded, and are derived from one or other of those races. The *urus*, or wild bull sort, has given rise to all or most of the different kinds which are met with in this kingdom and other parts of Europe, as well as in all the cold northern regions: and the *bison*, or hunched kind, has been the origin of all or most of the various sorts which now inhabit the warmer southern climates of the earth.

The descendants of each of these races gradually acquired additional points of distinction, in consequence of differences of situation, and diversity of food, the deviations and aberrations of nature, the capriciousness of keepers and managers, and other accidental circumstances; and from these causes have been produced all those natural varieties which are to be met with in this sort of cattle.

Again; as the art of cattle management became more generally and better understood, the

value of the points or parts of the different sorts of stock were ascertained, and it was discovered that by a combination of the rules of art with natural means, each of these distinctive points might be improved, and these improvements might be multiplied, until the breed attained that state which was considered most valuable or desirable. Thus it will be seen, that in process of time a multiplied variety of natural and improved sorts of neat cattle have been raised, which in their forms and qualities have little resemblance or relation to the race from which they originally proceeded.

No certain information can now be obtained respecting the original breeds of this country; a conjecture, however, may be hazarded, that in the more hilly regions and low valleys, it consisted of the small hardy kinds, and long and middle-horned varieties, without any of the short-horned, which, it seems probable, have been subsequently introduced into England from the opposite continent. The ground of this conjecture is the circumstance, that those breeds, such as the Highland, the Welsh, the North Devon, and the Lancashire long-horns, have from particular causes remained without much alteration by the admixture of any other kinds. In the opinion of some persons, however, the long-horned sort was originally brought into this country from Ireland, because the native stock of that island consists wholly of that breed; but on these points we have no better authority than conjecture. The breed which, on account of having no horns is termed the *polled*, is ascribed by some persons to Poland; but it is probable, as a want of horns is a part of the generic character, that a mixture of this sort of cattle might formerly have existed in this country, though now so blended and intermingled with others, as to leave no possibility of discovering the original.

APPELLATIVES, OR USUAL NAMES.

The common names of Neat Cattle are, Bull, Ox, and Cow. The bull is chiefly kept for the purpose of propagation; and until one year old, while he sucks, has the name of *bull-calf*, after which, *stirk* or *yearling bull*, and then *bull* of two or more years till six, when he is *aged*. The ox is the castrated male. A young castrated male, before the first year, is called an *ox*, or *stot-calf*, then a *yearling-stot*, or *stirk*—(stot and stirk are provincial terms)—at two years old a *steer*, or *twinter;* from two to five or six years a *bullock*, and after that an *ox:* but in some districts *bullock* is absurdly the general term for any full-grown cattle, male or female. A female, while sucking, is called a *why*, or *cow-calf;* after the first year, a *heifer*, *quy*, or *why;* at four years old, a *cow*, which she ever afterwards retains: and a castrated female is denominated a *spayed* or cut heifer or cow. Certain of the Welch and Scotch cattle, of rather a coarse and hardy kind, bear the appellation of *runts*.

Some sorts of neat cattle reach their perfection or full growth much sooner than others, as at five or six years old and earlier, others not until the age of eight or nine; but early maturity is in general a great advantage, and a mark of goodness in the breed or kind.

TEETHING.

The teeth, with the horn, shew the age of neat cattle. They are destitute of front teeth in the upper jaw; but the mark of age, as in some other animals, is to be found in the corner incisory teeth of the lower jaw. The first front teeth, or calves' teeth, remarkable for their

whiteness, are shed at two years old, and replaced by others not so white. Every succeeding year two other calves' teeth, next to the front, are also replaced, and at five years old, the incisory or cutting teeth, being all renewed, are of good length, whitish, and even. From this period, as in the horse, the teeth are gradually filling up, until six years old, when the beast is properly full mouthed. The teeth afterwards become discoloured by age, and are sometimes long and irregular.

The age of neat cattle may likewise be determined when three years old by the horns, which are shed, and replaced by others that continue. In the fourth year a horny ring, or cylinder, appears near the head, as the bud or basis of the horn. In the course of the year this ring moves, being pushed forward by another which succeeds it; a process which goes on to the end of the animal's life, its years being determinable by the number of the rings upon the horns, reckoning three years for the first. For the purpose of concealing the animal's age, dealers and jobbers very often obliterate these rings by shaving and dressing the horns.

CHEWING THE CUD, IN NEAT CATTLE.

This is the operation of re-chewing the swallowed food, by which means it is more effectually broken down and mixed with the saliva. Ruminant animals have no fore teeth in the upper jaw; but the gums are hard, and the tongue is rough. This roughness is occasioned by numbers of long sharp-pointed protuberances called *papillæ*, with which the whole substance of it is covered. These protuberances anatomists have observed to be turned towards the throat; so that by their means the food, having once got into the mouth, is not easily pulled back or returned. The animals, therefore, supply the defect of teeth by wrapping their tongues round the tufts of grass, and so by pressing such matters against the upper jaw, keep them stretched, and cut them with the teeth of the under jaw; then without much chewing throw them down into the œsophagus, or gullet—the tube and cavity which conveys the undigested aliment to the first stomach.

It has been remarked, that the retrograde motion of the œsophagus in ruminating cattle, such as cows, sheep, goats, and others, renders them capable of bringing up the softened grass from their first stomachs. But that when these animals fill themselves too full of clover and of other grass, or of some rich young vegetable substances, which are liable to run into fermentation, this stomach becomes distended with air, and death frequently ensues. This leads to the affection or disorder called hoven, which will be mentioned in its proper place.

It is well ascertained, that all animals which ruminate must have more stomachs than one; some have two, some three, and the ox tribe no less than four. The food is carried directly down to the first, which lies upon the left side, and is the largest of them all, vulgarly called the paunch, or great bag. There are upon its internal surface a vast number of small blunt-pointed processes, by which the whole has a general roughness, and the surface is extended to several times the size of the paunch itself. The food, by the force of the muscular coat of this organ, and the liquors poured into it, is sufficiently macerated; after which it is forced up from thence by the inverted action of the œsophagus, or gullet, into the mouth, to be further chewed, and thence it is again returned, made very small by further mastification, being completely united with the saliva; and this is

what is properly called rumination, or chewing the cud. For this purpose those teeth called *dentes molares*, or the grinding-teeth, instead of being covered with a thin crust, have an enamel on them consisting of perpendicular plates, between which the bone is bare, and constantly wearing faster than the enamel; so that the teeth remain good to an extreme old age; and the rumination is carried on for a long time, without any danger of spoiling them. After rumination the food descends by the gullet into the second stomach. The œsophagus opens indifferently into both, and ends exactly where the two stomachs meet; and there is a smooth gutter with rising edges, which leads into the second stomach, from thence to the third, and also to the fourth: into any of which the animal can direct the food at will. The second stomach, which is the anterior, or smaller, is called the honeycomb, from its consisting of a great number of cells on its internal surface, of a regular pentagonal figure, like a honeycomb. Here the food is farther macerated, and thence carried forward into the third, which is generally known by the name of the many-plies, or many-folds, because the internal surface rises up into a great many plies or folds, according to the length of this stomach. Some of these folds are longer than others; first two long ones on each side, and, within these, two shorter in the middle, and so on. There are numberless glandular grains, resembling millet seeds, dispersed all over the folds, from which some call this stomach the millet. From thence it passes into the fourth stomach, commonly called the maw, being the place where the chyle is formed, and from which the food descends immediately into the intestines. The bowels of these animals are of a considerable length, in proportion to the bulk of their bodies. Digestion is accompanied with a peculiar kind of ruminant action, the intention of which seems to be, that the food may be sufficiently broken or ground into small particles, and thus rendered fully capable of being acted upon by the stomach; for it is observed that a calf does not ruminate while it is fed only upon milk, though the action takes place as soon as it begins to eat solid food. But it is to be observed, that as long as a calf feeds only upon milk, the food descends immediately into the fourth stomach. The rumination does not take place till after the animal has eaten a considerable quantity; when it lies down, and begins to chew, though the operation will take place in a standing posture, if it cannot lie down.

In this action a sort of ball or lump is observed to rise from the stomach with great velocity, almost as if shot from a musket. This ball, or lumpy portion of the food, the animal chews very accurately, and then swallows it again, and so on alternately until all the food it has eaten has undergone the same operation. This is easily explained by the structure of the œsophagus, which has one set of fibres calculated for bringing up the grass, or food, and another for repelling it down again.

It is evident, therefore, that by means of rumination, the cow and all ruminating cattle extract a much larger portion of nourishment from their food than those animals which do not ruminate; and hence they are contented with much worse fare, and smaller quantities of it than the horse; hence, too, their dung being much more exhausted of its fine and rich parts than that of the horse, proves much inferior to it as manure for land.

By the number of stomachs, and the power of rumination thus given to animals of these kinds, which feed principally on long, tough, dry, hard matters, many different advantages

are gained:—in consequence of the more full maceration, and intimate mixture of the salival fluid and such materials, much more nourishment is derived from a given quantity of food, and the animal suffers much less inconvenience from the delay of the substances in the bowels.

In the plate which is subjoined, the differences in the nature and construction of the stomachs and bowels of animals which ruminate, and those which do not, may be clearly seen, as well as the order in which the food passes into them. It is first thrown down into the stomach marked Figure 1.; after due maceration there, it is gradually brought up again and more fully masticated, then it is sent down into that marked Figure 2, sometimes termed *king's hood* or *bonnet*, and further softened and reduced: it is from thence conveyed into that numbered Figure 3, from which it passes into the fourth and last, or red stomach, often termed the *caul*, in which the internal folds are rather long and large; and is then passed into the convolutions of the intestines, to have its nutritive properties more completely taken up and converted to their proper uses.

SECTION II.—*Principles and Practices in Breeding Neat Cattle, and other Sorts of live Stock.*

WITH a view to the improvement of the several breeds and kinds of live stock, different principles, practices, and systems of management, have been proposed; but those which appear to be the most suitable, correct, and proper for the purpose, to have the greatest foundation in practical experience, and to be the result of the latest and most full inquiry on the subject, are those given by Sir John Sebright, in his valuable letter on "the Art of improving the Breeds of Domestic Animals." This work, together with the remarks of several judicious farmers and breeders, who have investigated and explained the principles and practice recommended therein, establish beyond all doubt the following facts and axioms:

I. That the males and females, intended to breed together, should be provided with particular attention to the good or bad qualities of each, or "in reference to each other's merits and defects."

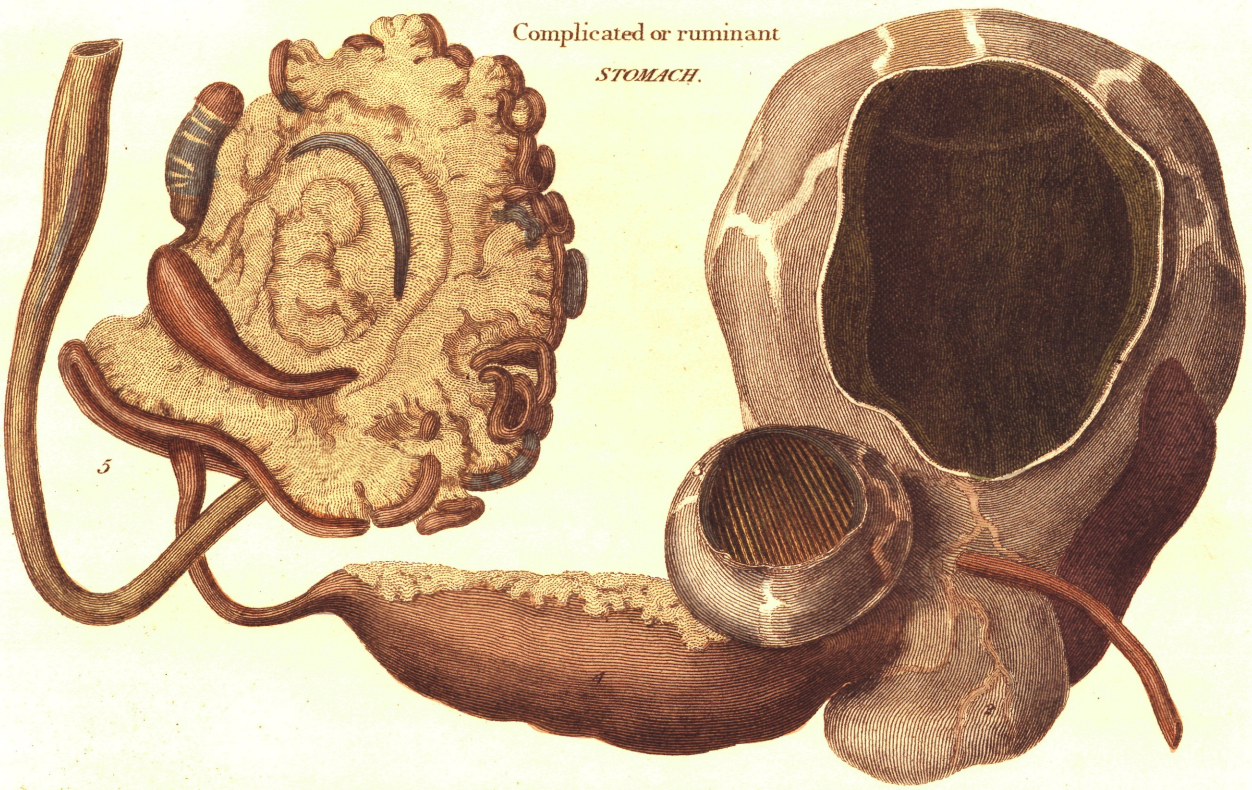
This is considered essentially necessary, as it is not always found, "by putting the best male to the best female, that the best produce will be obtained;" as should they each of them have a disposition or inclination to the same fault or imperfection, in however slight a degree, it will commonly preponderate and prevail to a much greater in the offspring, and thus decrease their value. The same faults or defects in the different sexes are unquestionably to be equally as much avoided and prevented, as the excellencies and perfections of them are to be united and combined.

II. That a breed or variety of any sort of animals may be considered "to be improved, when any desired quality has been increased by art, beyond what that quality was in the same breed, in a state of nature."

The increasing the natural good qualities and properties of different breeds and sorts of animals, should be the first consideration of the breeder, such as "the swiftness of the race horse, the propensity to fatten in cattle, and the fine wool in sheep, improvements which have been made in particular varieties of the several different species to which these animals belong." By such means, improved values are given to different sorts of animals as live stock.

III. That after a breed or variety has been rendered, in the above manner, as perfect as it

DIFFERENCE OF STRUCTURE IN ANIMAL STOMACHS.



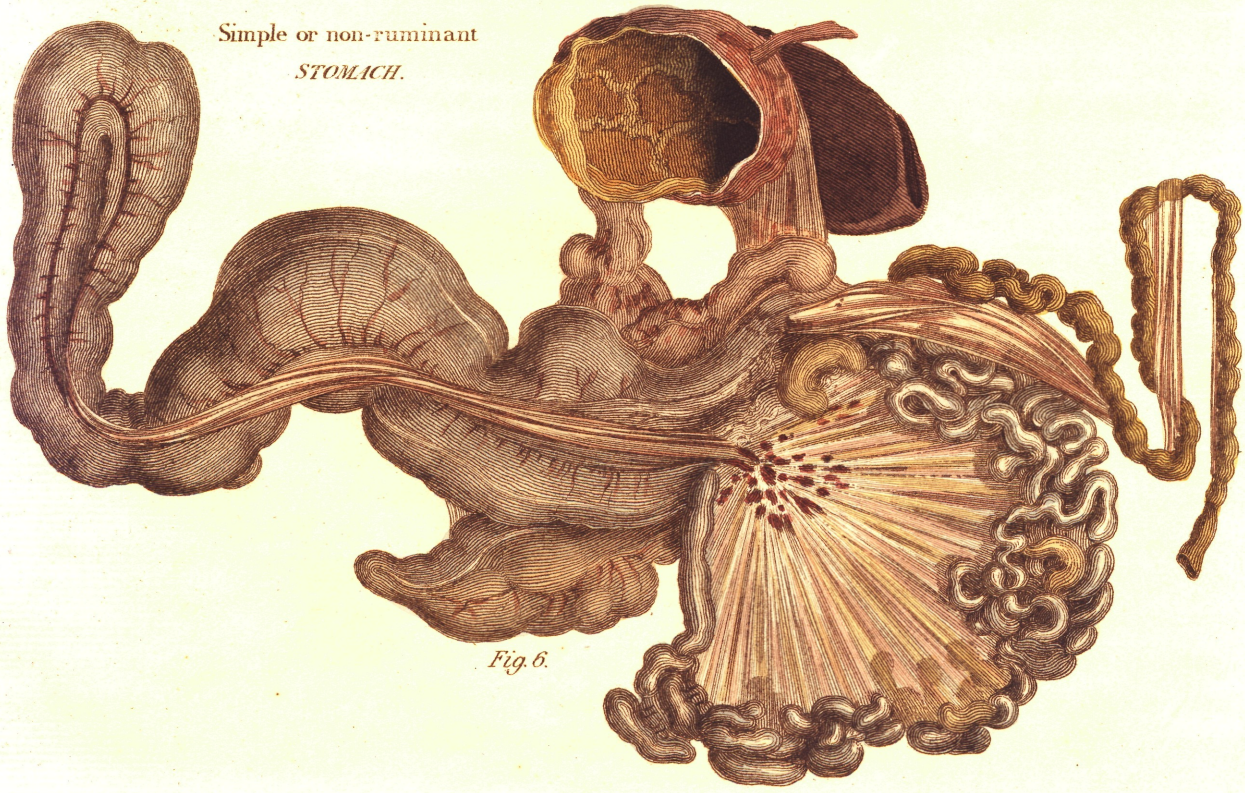


Fig. 6.

London Published by Thos. Kelly, *17 Paternoster Row. Jan.* 1823.

is capable of being made, " what has been produced by art, must be continued by the same means; for the most improved breeds will soon return to a state of nature, or perhaps defects will arise which did not exist when the breed was in its natural state, unless the greatest attention is paid to the selection of the individuals which are to breed together."

The same care, nicety, and exactness must be bestowed, in keeping up, as in forming the improvement itself; the smallest inclination or tendency to deviation or imperfection in the stock is to be attended to the instant it begins to make its appearance, in order that it may be counteracted " before it becomes a defect," and be corrected before it has attained too high a degree, but at the same time without carrying correction too far on the contrary side.

IV. That full and proper regard is not only to be constantly had to the " qualities apparent in animals selected for breeding, but to those which have prevailed in the race from which they are descended, as they will always shew themselves, sooner or later, in the progeny: it is for this reason that we should not breed from an animal, however excellent, unless we can ascertain it to be what is called *well bred;* that is, descended from a race of ancestors which have, through several generations, possessed, in a high degree, the properties which it is our object to obtain."

It is of the most essential importance, that the animals selected for breeding be not only *good* in themselves, and capable of being traced to parents which are the most pure and perfect of their kind, but that every intervening link in the chain of their ancestry should likewise have been good.

V. That " if a breed cannot be improved, or even continued in the degree of perfection at which it has already arrived, but by breeding from individuals so selected as to correct each other's defects, and by a judicious combination of their different properties, a position that will scarcely be denied, it follows that animals must degenerate by being long bred from the same family, without the intermixture of any other blood, or from being what is technically called *bred in and in.*"

Therefore, connecting animals for breeding that have too near or close a relation in blood to each other for a length of time should be avoided, though animals of different families of the same sort may often be united with propriety and advantage.

VI. That " if the original male and female were of different families, by breeding from the mother and the son, and again from the male produce and the mother, and from the father and the daughter in the same way, two families sufficiently distinct might it is supposed be obtained; for the son is only half of the father's blood, and the produce from the mother and the son will be six parts of the mother and two of the father."

In this manner of combining them, they would not be sufficiently near in their kindred or blood as to deteriorate their offspring or stock.

VII. That though " the occasional intermixture of different families" is believed " to be necessary," it is not " by any means approved of, to mix two distinct breeds, with the view of uniting 'wholly' the valuable properties of both. This experiment has been frequently tried, but has, it is believed, never succeeded. The first cross frequently produces a tolerable animal, but it is a breed that cannot be continued."

Thus, were it possible, " by a cross between the new Leicestershire and Merino breeds of sheep, to produce an animal uniting the excel-

lencies of both, that is, the carcase of the one with the fleece of the other, even such an animal so produced would be of little value to the breeder; a race of the same description could not be perpetuated; and no dependance could be placed upon the produce of such animals; they would be mongrels, some like 'the former,' some like 'the latter,' and most of them with the faults of both."

In the intermixing of different families of animals as crosses, much care and nice attention must be bestowed not to unite such as cannot have the valuable qualities or properties which they may possess, or an improvement of them perpetuated, and afterwards certainly produced in their offspring.

VIII. That a particular formation *generally* indicates a disposition to get fat in all sorts of animals; but this rule is not *universal*, for we sometimes see animals of the most approved forms, who are *slow feeders*, and whose flesh is of a bad quality, which the graziers easily ascertain by the *touch*. The disposition to get fat is more generally found in some breeds than in others. The Scotch highland cattle are remarkable for being almost all *quick feeders*, although many of them are defective in shape. The Welsh cattle have but little disposition to get fat; not from being particularly ill-shaped, but because they are almost invariably what the graziers call *bad handlers*."

Consequently, such animals as are well-shaped or approach nearest to the approved form, and which have the most proper *feel* in the flesh, should be employed in the raising and improving of such stock.

It cannot therefore be too strongly impressed upon the attention of the breeder and improver of different sorts of live stock, to be most particular in a just and suitably exact selection; in putting animals together that are not too closely related in their kindred, and in crossing the families and breeds of different kinds in the most fit and correct manner.

SELECTING.

The change which is capable of being made in any breed of animals by judicious and proper selection, is such as can scarcely be conceived, except by those who are sufficiently experienced in the business, as the beneficial consequences of it are often supposed to arise from other causes. It is evident, that for the purpose of breeding from, no animal can be fully depended upon, unless it be really good in itself, and have, in addition, been quite well bred in all the several stages of its ancestry.

As all the breeds and varieties of animals, while in their natural state, and before they have undergone any of the beneficial changes of art, are defective in some respect or other, and as individuals of the same breed are very differently formed and proportioned in their several different parts, care should be taken to select from whole herds, flocks, or collections, such only as are early in coming to perfection, and have other desirable properties, which give them superiority over others in the views of the breeder. Then, in proceeding with the produce even of these parents, the best and most suitable in every respect of each sex are to be further selected and taken as the future improving stock, while the remaining inferior portions are steadily to be refused as improper; and by thus rejecting every animal that is bad, inferior, or unfit for the purpose, great improvements and advances towards perfection in the breeding of animals may be made.

As the offspring that is produced by "some animals is very unlike themselves," it is "a good precaution to try the young males with a few females, the quality of whose produce has

been already ascertained;" as in this way and by this kind of selection, "the sort of stock produced, and the description of females to which they are the best adapted," will be the most certainly known, and of course the practice afterwards will proceed in the most perfect manner. Proper selection in breeding and providing male stock has tended to produce the greatest improvement in every kind of animals to which it has been applied.

There can be little doubt but that by this mode of selection in the practice of breeding, every desirable property in all kinds of animals may be promoted and improved. But the selecting for one single property should be avoided as much as possible.

The nature of the qualities and properties that prevail in any particular breed or family of animals, so as to form its excellence in the view of the breeder, will be considered and explained under the different proper heads.

BREEDING IN AND IN.

This is the practice of uniting the perfections of the same kind by continuing to breed from the best animals of the same line, family, or blood. It is founded on the notion that crossing is wholly unnecessary, and that animals are not degenerated by being bred in this way. Bakewell contended that the best sorts only ought to be bred from, which cannot be disputed, though it is to be ascertained what the length of time may be that the same family *bred* in such a manner will hold out to be the best; but since his time considerable change of opinion on the matter has taken place. The practice had, however, the effect of rooting out the ridiculous and mischievous prejudice, that was before entertained, against breeding from animals that possessed any degree of affinity between each other.

It was a practice which was believed, under careful and expert management, to afford the greatest security for attaining the improvements that were wanted, with the least risk of producing injury. It has been supported on the principle that good stock has been produced by it, not only without any sort of deterioration, but with continued improvement; and that many breeds of cattle and other animals which have remained for vast lengths of time in the state of nature, in certain situations, without any intermixture of others, although from their unrestrained condition they doubtlessly must have bred in all the different degrees of affinity, have nevertheless been found to continue without any sort of degeneracy or any injurious alteration whatever having taken place in them.

At the same time it must be remarked, that the trials that have been made of this method have not been very considerable; it being conceived as principally applying to perfect animals only, the existence of which is to be considered as doubtful.

Probably there never did exist an animal without some defect in constitution, in form, or in some other essential quality; and a tendency at least to the same imperfection generally prevails in different degrees in the same family. Thus "by breeding *in and in*, this defect, however small it may be at first, will increase in every succeeding generation; and will, at last, predominate to such a degree as to render the breed of little value." It is indeed conceived that by proceeding in this manner, the animals would at length fall into such a state of degeneration as to be *wholly* incapacitated for breeding. But the bad effects of this practice of breeding may be hastened or retarded by selection, especially in such animals as breed numerously at once. And it is conceived that

"there may be families so nearly perfect as to go through several generations, without sustaining much injury from having been bred *in and in;* yet that "a good judge would, upon examination, point out causes why they must ultimately fail, as a mechanic would discover the weakest part of a machine before it gave way." The practice of "breeding *in and in,* will of course have the same effect in strengthening the good as the bad properties, and may be beneficial, if not carried too far, particularly in fixing any variety which may be thought valuable."

Extensive correct trials, made upon different animals, in breeding *really* and perfectly in this method, have fully shewn that they decline greatly in size, become badly formed, and breed in a bad manner; at the same time that they are capable of having some particular property, for which they are considered valuable, so increased by it, that it becomes so overabundant as to be inconvenient and disadvantageous: and such has been the case with the new Leicester breed of sheep, where the very important propensity to get fat has been carried too far, and they have become in consequence small in size, tender, productive of little wool, and bad breeders.

So also, by selecting animals for one property only, the same effect will, in some degree, be produced as by breeding *in and in.* Animals with the wished-for propensity in great perfection will be gained, "but so deficient in other respects, as to be upon the whole an unprofitable stock." It should consequently be the aim of those engaged in breeding stock to obtain all the properties that are essential to the animals, as too much may be sacrificed even to a quality which is the most desirable, as has been just observed in the instance of the new Leicester sheep.

In breeding rather *close,* indeed, in this practice, as from the brother and sister, if each of them be very good, and especially if the same defects or faults should not prevail in both, "but the perfections of the one promise to correct in the produce the imperfections of the other," it cannot of course be objectionable; but "much further than this the system of breeding from the same family cannot in general be pursued with safety." It is probable, that the best animals are constantly raised where the practice is not carried on in too close a manner in relation to blood.

In respect to animals in the state of nature, many causes combine to prevent them from degenerating; "they are perpetually intermixing 'between themselves,' and therefore do not feel the bad effects of breeding *in and in:* the perfections of some correct the imperfections of others, and they go on without any material alteration, except what arises from the effects of food and climate."

Further, "the greatest number of females will of course fall to the share of the most vigorous males; and the strongest individuals of both sexes, by driving away the weakest, will enjoy the best food and the most favourable situations for themselves and for their offspring."

And "a severe winter, or a scarcity of food, by destroying the weak and the unhealthy, has all the good effects of the most skilful selection. In cold and barren countries no animals can live to the age of maturity but those which have strong constitutions; the weak and the unhealthy do not live to propagate their infirmities, as is too often the case with our domestic animals." It is to these causes that "the peculiar hardiness of the horses, cattle, and sheep, bred in mountainous countries," are to be ascribed, "more than to their having been

inured to the severity of the climate; for our domestic animals do not become more hardy by being exposed when young to cold and hunger: indeed, animals so treated will not, when arrived at the age of maturity, endure so much hardship as those which have been better kept in their infant state."

It will be found very beneficial in case only a single male and single female of a valuable breed could be provided to have "the offspring separated and placed in situations as dissimilar as possible; for all animals kept together are subject to the same effects of climate, food, and mode of treatment, and consequently to the same diseases, particularly to such as are infectious, which must accelerate the bad effects of *breeding in and in.*" But it is presumed that "by establishing the breed in different places, and by selecting with a view to obtain different properties in these several colonies, the breed may be kept up for some time without the intermixture of other blood."

These circumstances, regulations, and directions, in regard to the practice of breeding in the same line or blood, if closely attended to, cannot fail to produce many very important and useful effects, and must tend to render this manner of raising animal stock much more certain.

CROSSING.

This is the practice and means of supplying the faults or defects of one family or breed of animals from the merits or perfections of another, or uniting the latter in such a manner as to prevent injury, cause improvement, and render them capable of being propagated and continued in the future produce. But it does not by any means follow, on the grounds of either reason or experience, that by the union of distinct breeds such a complete conjoined effect can be produced, as the preserving of the good full properties of each as they separately existed. Since in all such combinations there will be a considerable diminution of the good properties, and some intermixture of the bad; and however desirable the union of the former may be, the conjunction of the latter is no doubt to be apprehended, as being equally liable to take place.

Mr. Wilkinson, an intelligent breeder of cattle stock, in his remarks on Sir J. Sebright's excellent letter, from which we have made such valuable quotations, observes "that which is generally to be expected from mixing the breeds of animals, possessing properties different in degree, is such an union of those properties in the progeny, that they may be greater than in the ancestry of the one side, but less than in that of the other, though the offspring will sometimes nearly resemble one parent only; that in crossing the cart mare with a blood horse, no man expects to obtain from the produce, the strength of the former with the speed of the latter; but an animal that is swifter than the cart horse, though incapable of drawing so great a burden." Still "it does not follow that no cross can be useful; it may be very much so." Thus "for instance, there are many situations which will, it is said, readily suggest themselves to the mind, where an animal with less speed, or less strength, than such a one as might reasonably be expected from the cross in the foregoing example, would by no means be so useful; and yet, where more of either speed or strength would be almost, if not altogether, unnecessary." In other cases, too, "it occasionally happens, that a breed of cattle which is possessed of the greatest excellence, may be too large for the pasturage of a particular situation; and yet a cross from these might obtain a very consider-

able advantage." Or further, that "a breed, which is unprofitable on the whole, is sometimes kept for the sake of a particular quality, which it possesses in so high a degree, that it would scarcely be the worse if this quality were somewhat diminished;" as is thought to be "the case with the Alderney cow; a breed which is kept by some of the nobility and gentry, entirely on account of the richness of the cream; but yet the quantity of milk afforded by them is so small, as to make them extremely unprofitable, even as milkers. It is well known, that the produce of this breed, when "crossed by a well-bred short-horned bull, are generally much better milkers than Alderneys; are more beautiful in their appearance, not being so raw-boned; and frequently come to a very considerable weight." The inference from what has been thus advanced, and supported by numerous examples, is that "where one breed is inferior to another in each individual point, the worse will generally be improved by the better, not partially, but altogether." But that "where distinct breeds possess their several advantages in different ways, to expect a full and complete union of the good qualities of each, without any mixture of the bad, is to expect a result contrary to the whole analogy of nature," and in direct contradiction to experience.

The same writer, too, is strongly of opinion, that a cross, even "from two distinct breeds," is capable of being "*obtained* and *continued*, so as to unite in almost an equal proportion, the properties of both." This, he says, has been seen effected in his vicinity "between the long and short-horned cattle," as "there were many dairies" of the former kind of cows there, descended from the Dishley stock, in favour of which their possessors were greatly prejudiced. "When, however, the improved short-horned cattle began to make such rapid strides," as was the case some time since, "many were willing to try a cross from them," but not to proceed further at that period. "This cross being extremely approved of, they rejected such as inclined too much after the one or the other: and continuing to breed from those that partook of the mean; a breed, usually called half-horned ones, was at length established, as well known by their particular characteristics, as either of the former."

A still further method of crossing, that has often produced very considerable benefit in improving inferior breeds, is, in the view of the same breeder, "by crossing the females of the worse with the males of the better, and their produce again in the same manner, through several succeeding generations. By this method, the blood of the former will be more and more exhausted, and a breed at length obtained nearly resembling the latter;" and that, as it is not seldom the case, that some individuals of the offspring take very greatly after one parent, and some after the other, this end will be approached and "accelerated or retarded, by a judicious or improper selection in each succeeding cross." As, however, the blood of the former or better sort, "though it be less and less in each succeeding generation, can never entirely be taken away; it will follow, 'it is said,' that the value of the produce, at any particular time, must depend partly on the value of the females from whence the cross originally descended."

It is noticed, in support of the same position and practice, by this experienced breeder, that "when the improved short-horns" had become so superior to that of the long, "and prejudice in favour of the latter was borne down by experience;" the cross of the two breeds, as already noticed, and the rest of the long-horned cows, "were put to bulls of the former descrip-

tion, and their produce again, through many generations; the result of which 'proved' that the last crosses, at length so nearly resembled the short-horned cattle, as scarcely to be distinguished from them. The same thing, 'it is said,' has been effected by crossing Scots in like manner, and, 'it is not doubted,' it might be produced from any breeds whatever."

Thus though the crossing method of breeding must be allowed to be extremely useful in many respects, yet the greatest care should be employed by selection, to adapt the animals in the best manner to the nature of the improvement which is required; otherwise the breed may be in danger of sustaining injury instead of advantage.

An experienced anatomist and physiologist has, on these principles, ingeniously endeavoured to ascertain in what instances crossing is proper, and in what prejudicial; and the principles upon which the propriety of it depends. "It has been generally supposed, 'he remarks,' that the breed of animals is improved by the largest males. This opinion has done considerable mischief, and would have done more injury if it had not been counteracted by the desire of selecting animals of the best form and proportions, which are rarely to be met with in those of the largest size. Experience has proved, that crossing has only succeeded in an eminent degree, in those instances in which the females were larger, than in the usual proportions of females to males; and that it has generally failed when the males were disproportionally large."

"When a particular variety approaches perfection in form, breeding *in and in* may be the better practice, especially for those who are not well acquainted with the principles on which improvement depends. When the male is much larger than the female, the offspring is generally of an imperfect form. If the female be proportionally larger than the male, the offspring is of an improved form. For instance, if a well-formed large ram be put to ewes proportionally smaller, the lambs will not be so well shaped as their parents; but if a small ram be put to larger ewes, the lambs will be regularly shaped. The proper method of improving the form of animals, consists in selecting a well-formed female, proportionally larger than the male. The improvement depends on this principle, that the power of the female to supply her offspring with nourishment is in proportion to her size, and to the power of nourishing herself from the excellence of her constitution. The size of the fœtus is generally in proportion to that of the male parent, and therefore when the female parent is disproportionally small, the quantity of nourishment is deficient, and her offspring has all the disproportions of a starveling. But when the female, from her size and good constitution, is more than adequate to the nourishment of a fœtus of a smaller male than herself, the growth must be proportionately greater. The larger female has also a greater quantity of milk, and her offspring are more abundantly supplied with nourishment after birth. To produce the best-formed animal, abundant nourishment is necessary, from the earliest period of its existence until its growth is complete.

It is supposed, too, that the power to prepare the greatest quantity of nourishment from a given quantity of food, depends principally on the magnitude of the lungs, to which the organs of digestion are subservient. To obtain animals with large lungs, crossing is the most expeditious method; because well-formed females may be selected from a variety of a large size, to be put to a well-formed male of a variety that is rather small. By such a

method of crossing, the lungs and heart become proportionately larger, in consequence of a peculiarity in the circulation of the fœtus, which causes a larger proportion of the blood, under such circumstances, to be distributed to the lungs than to the other parts of the body: and, as the shape and size of the chest depend upon that of the lungs, hence arises the remarkably large chest, which is produced, by crossing with females that are larger than the males. This principle of improvement, however, ought to be limited; for it may be carried to such an extent, that the bulk of the body might be so disproportioned to the size of the limbs as to prevent the animal from moving with sufficient facility. In animals, where activity is required, this practice should consequently not be extended so far as in those which are intended for the food of man."

In speaking of the characters of animals, or "those external appearances by which the varieties of the same species are distinguished, it may be remarked, that the characters of both parents are noticed in their offspring; but that of the male more frequently predominates. This may be illustrated in the breeding of horned animals; among which, there are many varieties of sheep, and some of cattle, that are hornless. If a hornless ram be put to horned ewes, almost all the lambs will be hornless; partaking of the character of the male more than of the female parent. In some counties, such as Norfolk, Wiltshire, and Dorsetshire, most of the sheep have horns. In Norfolk, the horns may, it is presumed, be got rid of, by crossing with Ryland rams; which would also improve the form of the chest, and the quality of the wool. In Wiltshire and Dorsetshire, the same improvements might be made by crossing the sheep with South Down rams. An offspring without horns might likewise be obtained from the Devonshire cattle, by crossing with hornless bulls of the Galloway breed; which would at the same time improve the form of the chest, in which the Devonshire cattle are often deficient."

These principles are further illustrated by examples to be met with in the great improvement of the breed of horses, which took place in this country, from the practice of crossing with those diminutive stallions Barbs and Arabians: and the introduction of Flanders mares into this island, was also the source of improvement in the breed of cart-horses."

On the same principles "the form of the swine has likewise, it is believed, been greatly improved, by crossing with the small Chinese boar."

For examples of the bad effects of crossing the breed, we may refer to the practice which was common,—when it became the fashion in London to drive large bay horses:—the farmers in Yorkshire then put their mares to much larger stallions than usual, and thus caused infinite mischief to their breed, by producing a race of small-chested, long-legged, large-boned, worthless animals. A similar project was, it is said, adopted in Normandy, to enlarge the breed of horses there, by the use of stallions from Holstein; and in consequence, the the best breed of horses in France would have been spoiled, had not the farmers discovered their mistake in time, by observing the offspring to be much inferior in form to that of the native stallions." Another instance that may be quoted, is that of some graziers in the Isle of Sheppey, who conceived, that they could improve their sheep by large Lincolnshire rams, the produce of which, however, was much inferior in the shape of the carcase, and the quality of the wool; and their flocks were

greatly injured by this attempt to improve them. Attempts to improve the native animals of a country, by any plan of crossing, should always be made with the greatest caution; for, by a mistaken practice, extensively pursued, irreparable mischief may be done. In any country, where a particular race of animals has continued for centuries, it may be presumed, that their constitution is adapted to the food and climate. The pliancy of the animal economy is such, that an animal will gradually accommodate itself to great vicissitudes in climate and alterations in food; and by degrees, will thus undergo great changes in constitution; but these changes can be effected only gradually, and may often require a great number of successive generations for their accomplishment. It may be proper to improve the form of a native race, but at the same time it may be very injudicious to attempt to enlarge their size."

The size of animals is, commonly adapted to the soil which they inhabit. Where the produce is nutritive and abundant, the animals are large, having grown proportionally to the quantity of food, which, for generations, they have been accustomed to obtain. Where the produce is scanty, the animals are small, being proportioned to the lesser quantity of food which they were able to procure. Of these contrasts, the sheep of Lincolnshire and of Wales, are examples. The sheep of Lincolnshire would starve on the mountains of Wales."

It is further noticed, that "crossing the breed of animals may be attended with bad effects in various ways; sometimes even when adopted in the beginning, on a good principle; for instance, suppose some larger ewes than those of the native breed were taken to the mountains of Wales, and put to the rams of that country; if these foreign ewes were fed in proportion to their size, their lambs would be of an improved form, and larger in size than the native animals; but the males produced by this cross, though of a good form, would be disproportionate in size to the native ewes; and, therefore, if permitted to mix with them, would be productive of a starveling, ill-formed progeny. Thus a cross which, at first, was an improvement, would, by giving occasion to a contrary cross, ultimately prejudice the breed. The general mistake in crossing has arisen, it is believed, from an attempt to increase the size of a native race of animals; being a fruitless effort to counteract the laws of nature.

The Arabian horses are, in general, the most perfect in the world; a superiority which probably has arisen from great care in selection, and also from being unmixed with any variety of the same species; the males, therefore, have never, it is supposed, been disproportioned in size to the females."

"The native horses of India are small, but well proportioned, and good of their kind. With the intention of increasing their size, the India company have adopted a plan of sending large stallions to India. If these stallions should be extensively used, a disproportioned race must be the result, and a valuable breed of horses may be irretrievably spoiled. In short, from theory, from practice, and from extensive observation, which is more to be depended on than either, it is reasonable to form this conclusion, that it is wrong to enlarge a native breed of animals, for in proportion to their increase of size, they become worse in form, less hardy, and more liable to disease.

The practice of crossing ought, therefore, to be well considered and carefully attended to by the breeder and improver of live stock.

The properties which seem more particularly to deserve the attention of the store-master,

breeder and farmer, in their different views and schemes of improving the breeds of live-stock, may be considered under the following different heads:

1. SHAPE.

The opinions and notions of breeders have differed very materially on this point; but it is evident there can be only one true and perfect form, which must be that which approaches the nearest to exactness in the shape and proportion of the different parts. This regular proportion of the several parts undoubtedly constitutes the true form, and is that which ought to be aimed at by the breeder and rearer of cattle stock. At the same time other qualities, in connexion with symmetry of form, must be attended to, especially in animals raised for the purpose of human food, such as a disposition for, and capacity of, taking on flesh in the best and most valuable parts. It must be constantly recollected, that where there is much excess or deficiency in the proportions of the parts, which constitute the form of animals, injuries and inconveniences naturally result: either they are weak and feed slowly, which occasions them to require a greater length of time in fattening; or else they fall greatly short in weight and value, by not laying on meat sufficiently in the best parts. Thus, though it must always be greatly desirable to bring the shape of such animals to as high a degree of perfection as possible, without, perhaps, reaching that roundness, fineness, and fulness of the parts which constitute perfect beauty; yet their chief use, for the advantage of the breeder is, however, never to be neglected or overlooked. The proper and suitable form in such cases is probably that given below.

Mr. Cline, an able and experienced anatomist and physiologist, has observed, that "the external form of domestic animals has been much studied, and that their proportions are well ascertained. But as the external form is an indication only of internal structure; the principles of improving it must, therefore, be founded on a knowledge of the structure and use of the internal parts."

THE LUNGS.

These are, doubtless, of the first importance. It is on their size and soundness that the strength and health of an animal principally depend. The power of converting food into nourishment is in proportion to their size. An animal with large lungs is capable of converting a given quantity of food into more nourishment than one with smaller lungs; and therefore has a greater aptitude to fatten.

THE CHEST.

The external indications of the size of the lungs are the form and size of the chest; the former of which should approach to the figure of a cone, having its apex situated between the shoulders, and its base towards the loins. The capacity of the chest depends on its form more than on the extent of its circumference: for where the girth is equal in two animals, one may have much larger lungs than the other. A circle contains more than an ellipsis of equal circumference: and in proportion as the ellipsis deviates from the circle, it contains less. A deep chest, therefore, is not capacious, unless it be proportionally broad,

A narrow chest is injurious; as there is too great a confinement of the internal parts destined for the purpose of respiration and the formation of the nutritious material.

THE PELVIS

Is the cavity formed by the junction of the haunch bones with the bone of the rump. It

is essential that this cavity should be large in the female, that she may be enabled to bring forth her young with less difficulty. When this cavity is small, the lives of the mother and her offspring are endangered. The size of the pelvis is chiefly indicated by the width of the hips and the breadth of the twist, which is the space between the thighs. The breadth of the loins is always in proportion to that of the chest and pelvis together.

THE MUSCLES AND TENDONS.

These should be large, by which an animal is enabled to travel with greater facility.

THE BONES.

It is well observed, that the strength of an animal does not depend on the size of the bones, but on that of the muscles. Many animals with large bones are weak, their muscles being small. Animals that were imperfectly nourished during growth have their bones disproportionately large. If such deficiency of nourishment originated from a constitutional defect, which is the most frequent cause, they remain weak during life. Large bones, therefore, generally indicate an imperfection in the organs of nutrition.

THE HEAD.

This should be neatly and compactly formed; neither too large, nor of too great a length. It should rather, indeed be small, by which the birth is facilitated: its smallness affords other advantages, and generally indicates that the animal is of a good breed.

THE NECK.

This part of the animal should never be of too great a length, but somewhat thin, gradually narrowing from the breast towards the head. The length should be proportioned to the height of the animal, that it may collect its food with ease.

THE LEGS

These should be proportioned to the general size; the fore legs should be straight and clean, the hind ones forming an angle at the hock, so as to stand well under the loins: the distance between the feet in the different extremities equal; the feet round and even, and the hoofs straight.

THE BELLY.

This should be firm and capacious, without swagging, and the quarters deep, full, and well fleshed downwards.

HORNS.

These are considered as useless to domestic animals, and are often the cause of accidents. It is not difficult to breed cattle without them. The breeders of horned cattle and horned sheep sustain a loss more extensive than they may conceive; for it is not the horns alone, but also much more bone in the skulls of such animals to support their horns, for which the butcher pays nothing; and besides this, there is an additional quantity of ligament and muscle in the neck, which is of small value. The skull of a ram with its horns weighed five times more than another skull which was hornless. Both these skulls were taken from sheep of the same age, each being four years old. The great difference in weight depended chiefly on horns; for the lower jaws were nearly equal, one weighing seven ounces, and the other six ounces and three quarters; which proves that the natural size of the head was nearly the same in both, independent of the horns and the thickness of bone which sup-

ports them. In a horned animal the skull is extremely thick; in a hornless animal it is much thinner, especially in that part where the horns usually grow. To those who have not reflected on the subject, it may appear of little consequence whether sheep and cattle have horns or not; but on a very moderate calculation it will be found that the loss in farming stock, and also in the diminution of animal food, is very considerable from the production of horns and their appendages. A mode of breeding which would prevent the production of horns would afford a considerable profit in the increase of meat and wool, and other valuable parts. They, however, are not only very ornamental to the animals, but they constitute an article of considerable value in the trade and manufactures of the kingdom.

The long and pointed horns are certainly dangerous, and the following method of eradicating them may be practised without the least inconvenience. The operation must be performed on the calf at the age of two or three weeks, when the horns are just beginning to shoot, and may be found loose between the bone of the skull and the skin. These small knobs, or horns in embryo, are of a gristly nature, in substance much softer than horn, and more compact than the skin; they may be cut on each side, but not to the bone, there being space enough between the horny part of it. The horn must be taken out by a sharp knife or some other instrument, and the wounded part be immediately seared with an iron instrument, hot enough to stop the bleeding and keep out the external air. It is asserted, that there is no danger in those parts of bleeding too much, but the sooner they are seared after cutting the better. If the calf be kept within doors, there is no danger of its taking cold in the wounded parts, and very little danger if kept without doors, except the weather be unfavourable; and even then the danger may be prevented by applying a small plaster of pitch, or some other sticking substance over the wounded parts, which are often known to be healed in a very few days.

The horns of cattle are general designations of distinction and variety, and are supposed to denote particular qualities. Thus English beasts are distinguished as long, half-long, short, and middle-horned, wide and broad-horned, polled, or hornless. The grand distinctions, however, are the long and short-horned, which are generally accompanied with peculiar properties of milk and hide. Horns are also useful for marking the ages of beasts, and for other purposes.

THE EYE.

This, and not the horn, some suppose, is the criterion or point of a beast which may be most universally depended upon as a guide to the grazier. The eye, which should be bright and prominent, is a mirror in which the health and habit of the animal may be seen with a degree of certainty. A mildness and meekness in the look, without any sort of boldness, are considered certain marks of feeding in a proper manner.

THE COLOUR.

Formerly particular colours gave rise to many ridiculous notions and prognostics, but they are, in fact, very immaterial, except that white and light colours may be preferred, on account of a supposed tenderness of the meat, of which more will be said when treating on the nature of flesh. The most predominant colours are those of black, white, red, brown, and dun; but they are likewise often mixed, as spotted,

brindled, or flecked. The most hardy colours are said to be the blacks, reds, and browns.

The writer of the Sussex Agricultural Report remarks, that it has been contended that white is the infallible criterion of degeneracy in all the animals of the creation; that such coloured oxen and cows are weak and tender; and that no animal is met with of this colour in native health, and vigour. In confirmation of this remark, a reverend gentleman, Mr. Ferryman, has observed, that the white colour is the test of decline, and that those colours in the animal world which contain the most vivid hue, and are of the most shining lustre, mark animals endued with the greatest portion of health and strength: that birds, when confined in a cage, shift their plumage to the sign of decline or degeneracy: that the common poultry with high-coloured plumage are every way superior to white and its kindred; and that among mankind a healthy habit is visible in the floridness of the constitution; while, on the contrary, sickliness is shown by the paleness of the looks, and grey-headed age by the whiteness of the locks: but here the reporter justly asks, what traces of weakness are evident among the frozen inhabitants of the arctic circles? What sign of any want of spirit, vigour, or health, is noticeable in the forest-tracts bordering on the Poles, which are inhabited by bears black and white. Many sorts of the animals of the Siberian forests, it is said, regularly change their colour to a white on the approach of winter, and return to their original colour in the spring. But on what principles of degeneracy it is demanded? The European swan is a pure white, the New Holland black; but neither of them are a degenerate race, as the above writer justly remarks.

Dark colours, besides hardiness, are supposed generally to denote quick feeders in all sorts of neat stock, though not always. The yellowish dun and whitish tinges foretel quick feeders, and the varying sort of hair is a sure indication of fattening in all neat cattle.

REQUISITE AND MOST SUITABLE FORM.

On the shape or form of an animal, it has been well observed, that "inequality of parts betokens weakness and imperfection, whereas just and equal proportion is the truest indication of strength and of ability in the animal, to produce, and sustain the greatest possible load of flesh. Should there be a deficiency of length and depth, we shall not only experience a deficiency of general weight, but especially of lean, by far the most valuable part of the animal's flesh. Short and round animals, although quick feeders, and of hardy constitution, fail in weight, and are apt to produce entire masses of fat: and the whole form being, as it were, crowded into the shape of a tun, we in vain seek that depth and substance in some of the noblest parts, which are to be found only in a well-proportioned carcase. On the other hand, the carcase being too long, denotes delicacy, inaptitude to fatten, a demand of much food, and a great consumption of time. The loins being narrow and thin, and the feet standing too close, are both signs of weakness as well as very unsightly defects. When the fore legs approach too near, it may be presumed, from the consequent narrowness of the chest, there will not be sufficient room for the action of the lungs during the period of fattening, and that risk may be incurred of that common accident, their adhesion to the ribs. Sickle or crooked hams, or the standing out too far of the hinder legs, so that they appear to drag after the body, are very unfavourable indications, and very disgusting in appearance. Thus, whatever be the height or size of the

beast, the three grand requisites of form are the proportional union of length, depth, and substance, which assures the inherent and desirable qualities of each. The peculiar points of each species of stock will ever be found in a perfection commensurate with the general good shape of the animal."

But the above detail and delineation have been confined to "the characteristics of strength and utility solely, leaving untouched the lines of beauty, which may be defined to consist chiefly in the oval form or in the neat rounding of the parts. Thus, in horses and neat cattle particularly, instead of that excessive squareness and flatness of the shoulder, the side, and the buttock, depth ought to be relieved by a gentle fulness and swell, which are tokens both of beauty and substance; nor should there be any sharp bony protuberance, either upon the shoulders or hips, to offend the eye, by detracting from the plump and even proportion of the form."

"The chief object of the breeder and feeder being to fatten the carcases of his cattle, it may be supposed that any strong and healthy animal, however awkwardly proportioned, will answer the purpose;" but it is well known, and has been confirmed by all experience, that "attention to form is rewarded by quantity of product."

The most important points for ensuring the true proportion of form and the greatest weight of meat, as marked out by the intelligent breeder before noticed, are, that "the head 'should' be rather long;" the "muzzle fine; the aspect calm and placid; the horns fine; the neck light, particularly where it joins the head; the breast wide, and projecting well before the legs; the shoulders moderately broad at the top, and the points well in; the chine, when the animal is in good condition, so full as to leave no hollow behind them; the fore flank, 'which is the lower part of the side just behind the fore legs,' well filled up; the girth behind the shoulders deep; the back straight, wide, and flat; the ribs broad, and the space between them and the hips small; the flank full and heavy; the belly well kept in, and not sinking low in the middle, the whole forming, not a round or barrel-like body, 'which leaves' a deficiency both in the upper and lower part of the ribs, or want of depth in the sides; the hips globular, wide across, and on a level with the back itself; the hind quarters, from the hips to the extremity of the rump, long and straight; the rump points fat, and coming well up to the tail; the twist wide, and the seam in the middle of it so well filled, that the whole may very nearly form a plane, perpendicular to the line of the back; the lower part of the thigh small; the tail broad and fat towards the top, but the lower part thin; the legs straight, clean, and fine-boned; and, when the animal is in high condition, the skin of a rich and silky appearance."

In breeding animals, the nearer these forms of the several parts are approached, and the more they are combined, the greater will be their degree of perfection in shape.

But goodness of shape, though it very commonly indicates the ready taking on of flesh and fattening in animals, is not always a sign of that being the case; therefore, not only a nice and exact discrimination of the whole, and the principal points or parts of animals, but a careful selection of such as are the best fleshed, as ascertained by the *feel*, becomes essential; as the contrary sort are equally improper to breed from, as those which want proper shape altogether, or in particular parts.

The next property which the stock master and farmer should attend to, in the improvement of the breeds of neat cattle and oxen, is,

2. SIZE;

Which is, in a great degree, connected with the shape of the animals; though there is a variety of size, which admirably adapts them to the variations of soil, climate, situation, and food, and to the different views and purposes of their breeders.

The following questions have long been agitated, but never fully decided: Are large or small-sized animals the most profitable? Do they pay the grazing farmer the most money for the food they consume? What is the difference in the growth, or increase of weight, or capability of labour, between the large and small animals, in proportion to the quantity of food which they take for their support? And, lastly, What relation is there in the increase and quickness of feeding of stock of different sizes, and the quantity of food which they consume? The variation of circumstances, and other difficulties, must always prevent these points from being ascertained; and therefore no infallible conclusions or directions can be drawn in respect to the size of cattle, for the purpose of governing the conduct of the breeder, grazier, and fattener of neat cattle. Some imagine that largeness of size is a desirable property, as it affords the means of feeding to a great weight; but as this must be acquired by a much larger and longer-continued consumption of food, it is probable that, except in situations where food is abundant, and, consequently, cheap, the smaller-sized animals may be the more profitable. The indefatigable Mr. Bakewell considered, that the "smaller the bone, the truer the make of the beast," and the quicker in fattening; hence it would appear, that the small-sized are more advantageous than the large; and, indeed, the experience and notions of graziers in general favour the same conclusion, that the middling and small breeds are the most profitable, from their fattening with the greatest expedition. It has been remarked, too, but the observation can only apply to the old unimproved sort, that the Lincolnshire and Holderness breeds of neat cattle, "are very large, but their size lies in their bones; they may be fattened with great loss to the grazier;" but can never "return so much for a given quantity of grass as the small-boned, long-horned kind," or improved Leicestershire sort. Some, however, contend, that the difference in the consumption of food, between the large and small-sized animals, is not so considerable as is generally supposed: and an able and ingenious inquirer on the subject, who has the support of many others, is of opinion, that large cattle are more profitable, from their not consuming food in the proportion of their weight. Having put the question of the difference in the weight of food consumed by the large and small-sized in a given time, to different breeders in different parts of the district where he resides, he found that they agreed, "that the same quantity of food was given to the smallest and largest beast of the same age; that the largest, even when not master of the same fold, often kept itself in the best condition; and that every thing depended on the disposition to fatten, and very little on the size of the animal. He adds, that his experience in his own stock confirms the facts. It must be allowed, that considerable latitude may take place in this respect, and that a certain quantity of large cattle will generally consume more than the same quantity of small ones; but not by any means in proportion to their weight or size.

The following, however, are *certain* advan-

tages in the smaller-sized animals,—they are capable of being fattened wholly with grass, without having recourse to the more expensive kinds of food, which must be the case with those of a larger kind, and on pastures of inferior qualities; they are also procured with less difficulty, and are more adapted to the particular situations and circumstances of farmers; and the loss is less when accidents happen to them.

The difference in the quality of the meat, from the difference of size, is thought, by many, to be in favour of the smaller sort, as, in those, the fineness of the muscular fibre, or what is commonly termed, the grain of this sort of food, has been deemed the most delicate. On this account, as well as that of convenience, the mutton, beef, and other sorts of meat, of small animals, are constantly preferred; though others, who indulge in the pleasures of the table, think the meat of large animals more delicious and nutritive, particularly beef and mutton; and on this account the markets at certain times of the year make a grand exhibition of the largest carcases that can be procured.

It is indeed contended by the above experienced inquirer, in opposition to the idea that smaller animals, when fattened, are in common worth more for any given weight of meat than large ones, that if the animal be taken as it stands in the pasture or stall, the contrary is the fact; but when the butcher merely buys what are termed the valuable parts, and receives the offal into the bargain, he will, unquestionably, for obvious reasons, "give more for two cows of twelve stone each a quarter, than for one of twenty-four." The offal is of much greater value, besides a considerable advantage in the hides. In short, it is concluded, that "the difference between the weight of the animals when living and of the four quarters, when dead, is always in an *inverse* proportion to their size, when their forms and merits are equal; but the bones will *then* be in proportion to the *living weight*, and therefore small animals must be, in this case, *most disadvantageous to the consumer*." It is also supposed, that the meat of large animals, when preserved for future use, is better than that of the small, from the juices being more fully retained in it, and there being less waste, on account of the external surface being proportionately less.

On the other hand, it is contended, that on account of the greater size of the muscular parts in large animals, the flesh must be more coarse and less valuable than that of the small. It is also asserted, that small-sized animals are less prejudicial in poaching the ground than large ones, on account of their feet being wider in proportion to the weight. It is, however, suggested, by the same inquirer, that "the question is, whether the feet and mouths of two small animals will not injure the herbage more than that of one large one." It is noticed, that small sheep do not poach the ground; yet it is supposed, that "a score of these, weighing a ton in the aggregate, will do more injury to a rich pasture in forty-eight hours than an ox of the same weight in a week.

And in regard to the opinion, that animals of the smaller kinds are in general more hardy than those of the large breeds, it is contended, that if it be meant merely that they are capable of subsisting on shorter herbage, it is right; as a large animal, though it may have exactly the same form as the small one, necessarily requires more time for rest. It feeds and removes itself with greater labour; and notwithstanding it may be as strong again, as having the double weight, it will still, in relation to itself, be a weaker animal. Its head and neck will be as

heavy again, and, from their greater length, the weight will recede further from the centre of motion in the shoulder; consequently, increase in power in proportion to the distance; and the same thing holds good in respect to the whole of the limbs. In the stall, or the fold, however, where large oxen are mostly fed, these disadvantages are of no consequence, as the food is received without the trouble of searching for it; and if the necessity of a better pasture does not proceed from the larger animal consuming much more, but from less power in collecting food, the consequence will be, that it must afford the largest weight of flesh with the smallest consumption of food or keep.

In dairy cattle, the advantage may be on the side of small animals, as such cows will give nearly the same quantity of milk each as the large ones, and are capable of subsisting on shorter pasture, without injuring the ground in the same degree: but when the weight and value of the meat form the principal considerations, then the largest animals are to be reckoned the most beneficial to the breeder and the public. Hence it appears, that both the large and small animals have their respective advantages, and that the attention of the breeder should be principally directed by the nature and circumstances of his pastures, as well as the command of other food which he possesses; the middle and smaller breeds of live-stock being preferred on the less rich and inferior kinds, and the large sorts in such situations as are more rich and fertile, and wherever there is a sufficient supply of food.

In an useful work on cattle, it has been observed, that "individual variety of size and shape prevails in all breeds, to the infinite use and convenience of man. Thus, in an established large breed of cattle, there will still be gradations of size, suitable to various soils and purposes. There will be also in every sort individuals which run naturally to length and depth of carcase: others which have a tendency to the contrary form, with much substance, wide loins, and short legs. Many entire sorts possess certain of these as distinctive properties. The improving breeder, in joining the sexes, will take advantage of these varieties of shape, or peculiar properties. He will increase length and depth of carcase, when required, or moderate too great length with its opposite, with rotundity of form, and width of loin, and shortness of leg; ever having especial regard to preserving *substance* in the form of his stock, and to prevent the increasing length and too near approach of the legs. It is very common for our best breeds to degenerate in this way, from neglect; in which case it will be necessary to change the males for others of a still shorter and more substantial form, either from the same or a kindred variety, and to pay an increased attention to the selection of females."

It has been stated also, that "every kind of pasture is fitted to raise animals to a particular size. When beasts are brought in of a larger size than the quality of food is calculated to support, these animals, whether cows, sheep, or any other kind, will degenerate apace, and will never prove useful until they come down to the standard, or size adapted to their situation, and suited to their food." And that, "on the other hand, when a smaller breed than ordinary is brought in, they continue to increase in bulk until they come up to the pitch that is suited to their nourishment. But there is this remarkable difference in respect of profit, betwixt these two progressions; that in the retrograde progress, when animals are brought from rich pasture and a comfortable situation to the reverse, they are in every instance worse than

the indigenous breed; whereas the animals which are brought from worse to better, continue to improve till they arrive at that perfection which the change in their situation is calculated to produce. These causes may not immediately have their full effect, but in a few years they certainly and evidently will." It is therefore thought that "the improvement of the soil ought to go hand in hand with the introduction of a larger breed of cattle; and a large breed ought, for the same reason, to be introduced in that degree in which the style of agriculture is improved." In support of this, it has been further stated, that "the richest grazing land and the most nourishing artificial food will certainly pay more in feeding large bullocks, sheep, and swine, than it would do in feeding the smaller sizes of the same species," and that "it is equally obvious that the smaller breeds will answer better on the poor pasture than the large."

These are the statements and conclusions that have been commonly held upon the subject; but the improvements that have now been made in stock of different kinds, sufficiently show that much larger animals of such kinds as are really good and valuable in their several particulars may, in all cases, be beneficially sustained and kept, than of such as are of an unimproved inferior quality; consequently, that they should always be of a good proper size, as the inconvenience and injury of keeping small-sized stock are often laid to the account of the land, when they ought rather to be attributed to the sort of animals which are kept.

It seems probable also, from many trials, that the difference in the consumption of food by large and small animals is chiefly material as it respects the length of time which they take in fattening, and the proportion of offal they each afford; and upon a calculation, the preference, in point of profit, is certainly to be given to large animals. Upon the whole, it is evident, more attention ought to be paid to size and aptitude for fattening, than has hitherto been bestowed on these subjects.

3. DISPOSITION.

This quality materially depends upon the manner in which animals are brought up. It is well known that Mr. Bakewell rendered all his live stock, even his bulls, so tame and gentle that the management of them was attended with very little difficulty or trouble. It is a matter of extreme utility and importance to all breeders, that their domestic animals should be of mild dispositions, without being dull or sluggish, as they are then capable of being reared, fed, and rendered fat, with considerably less food, and with much more facility, than when they are wild and unruly, and disposed to ramble and break the pastures. Animals when young may be rendered gentle, in most cases, by careful management.

A calmness and placidity in the appearance of animals, without that prominence or boldness of the eye, which often indicates badness or unruliness of disposition, give the most certain marks of that temperate steadiness and evenness of temper, which is so necessary for quick feeding, and so desirable in many sorts of live stock. But such a natural tendency, so displayed in the aspect of an animal, may be changed by bad usage, disease, or other uncertain causes.

4. HARDINESS OF CONSTITUTION.

This is the next property in neat cattle that deserves the breeder's attention; it is indeed absolutely essential and indispensable in exposed situations, and under all circumstances

it must be advantageous to the farmer that a breed is not liable to disease. Every one must be convinced that hardy animals thrive much better than those which are naturally tender and delicate. Darkness of colour, as before observed, and roughness of hair have been commonly supposed to denote hardiness and vigour; but animals of other colours have proved equally robust and hardy. It has been already mentioned, that colour has led to many fallacious opinions, and is, consequently, no absolute criterion. Hardiness of constitution chiefly depends on the breed and the manner in which animals are brought up.

It is a fallacious notion, that exposure to all the risks of climate contributes to the hardiness of live stock. Domestic animals should not be allowed to bring forth in exposed situations, whereby they are subject to the injuries of wet and cold. In the summer season only, they can remain with safety unsheltered; but in winter, spring, and autumn, they require outhouses, sheds, or well-sheltered fold-yards, to protect them from the cold rains and piercing winds. All new-dropped animals, as may be rationally expected, are extremely susceptible of the impressions of cold; and indeed the dams also, on account of the temporary debility occasioned by parturition. Though many of the young animals thus exposed escape the dangers of wet and cold, yet several fall an immediate sacrifice, and more perhaps are consequently afflicted with latent disorders, which considerably obstruct their future improvement; and though the dams are not so often fatally affected, yet they frequently sustain injuries which can never afterwards be effectually removed. The state of wild animals has been referred to as a proof that domestic animals of the same kind should be inured to the inclemency of the seasons: but the numbers of animals, which perish in their natural state, and which might be preserved if domesticated and gradually exposed to the cold, can never be ascertained.

In the most hardy breeds there are always some individuals, which no possible means will render equal in that particular to their fellows; and yet, with proper care, they may be rendered equal to them in profit.

5. EARLY MATURITY.

The amount of profit to the breeder must always depend, in a great degree, on the quick maturity of his domestic animals; and indeed it is a property that greatly interests the public as well as the farmer, for it is obvious, that abundance of supply is, in a great measure, connected with early maturity. Some sorts of cattle stock, on account of their labour or their produce, may probably be kept longer with profit by the farmer than others; such is the case, it is supposed, with neat cattle, though not with sheep; yet the latter is productive in various ways, so that this distinction appears not to be well founded. Undoubtedly the manner in which animals are fed must have considerable influence in the raising of live stock; for when, from the constant supplies of food, they are always kept in a thriving condition, they will, whatever the nature of the stock may be, arrive much earlier at the state of maturity than under the contrary circumstances. It has been asserted, that under this mode of treatment a greater progress is made in three years than is effected in five when the animals are stinted in food, and suffered, by the want of proper care and warmth, to be stunted or stopped in their early growth. It has been long a remark, that "cattle well *summered* are half *wintered*; that is to say, cattle going to the straw yard in high condition will preserve a good plight

throughout the winter; whereas, such as have been fed upon short fare during the summer, and go to straw in a weak condition, are liable to become worse, or even to drop off in the winter season, particularly if it be unfavourable. Very young cattle and old cows are the most dangerous stock under these circumstances." But whatever influence the nature of the keep may have, as one breed or sort of animals, under exactly the same kind of keep, reach the point of perfection long before another, it is evident that the principle must exist and be inherent in the quality of the breed or variety itself, and that consequently this property must be well attended to in choosing animals of all kinds for the purpose of breeding. It would appear to be much connected with disposition and shape though not wholly depending on them.

6. FLESH.

The nature and properties of flesh are of much consequence to the breeding and grazing farmer; yet after the observations which have been made on the size of animals, it is not so necessary to say much respecting the quality of flesh; which seems, according to some, to be a property inherent in the muscular substance, and probably depending, in a great measure, if not wholly, on the breed. A writer, in speaking of the breeding of animals in the midland districts, where the flesh is "spoken of with the same familiarity as the hide or the fleece," observes "that the grain is clearly understood to depend wholly on the *breed*, and not, as has been heretofore considered, on the *size* of the animal." It has been intimated that white and light colours may be preferred for the tenderness of the flesh; but "colour is probably, in a great measure, fixed and inherent, and the sole effect of breed," while "the difference in the flavour of the flesh of different breeds or varieties of animals appears to depend, in a great degree, on the nature of the food." This supposition seems more rational, and there is little doubt but that proper keep will always be found advantageous in this respect.

Sometimes a very material deviation from the natural colour of flesh is met with in meat; which is probably the effect of a morbid condition of the animal. In the living state, the proofs of good flesh are a mellow, rich, elastic, and rather firm feel, without any degree of harshness; and in the dead condition, a similarity of feel, with a fine grain and marbly appearance. No doubt the difference of age and sex affords some variety in respect to the quality of flesh, for in old animals it is more firm, but less tender and juicy than in those that are young; and though the fineness of the grain is more remarkable in animals of the female than those of the male kind, yet the flesh of the latter when young is more nutritious and palatable. Every body prefers a round of ox beef to that which contains the udder; and a leg of wether mutton is more desirable than a ewe one. Some of the more northern breeds of Scotch cattle are said to excel much in the quality of their flesh when well fattened and killed at a proper age. The property of flesh appears in some degree connected with that of disposition to fatten.

With a view to the raising improved cattle stock, it is important to caution those who have not had much experience in the art against a certain sort of animals, which have the term *light* fleshed usually given them; to which there is an objection, "not on account of the quality of the flesh as regards richness, but the defi

ciency of its quantity when the animals 'are' in a lean state;" and which, when seen in their full fat condition, "for want of better judgment," and the ability "to distinguish between fat and lean," may attract a preference. In this kind, it is noticed, there is a want of profit to the grazier, as well as to the consumer. "They are not profitable to the grazier; first, because they are naturally tender;" and then further, "they carry so small a quantity of flesh in their lean state, that they have much to do when put to feeding before they come to any tolerable weight." Nor do they afford profit or saving to the consumer; "for fat without lean is of no other use than to be wasted in the kitchen." In all cases, when found in the hands of breeders, it is noticed to be where the practice "of keeping their stock is remarkably high; and when they are sold, and kept as store stock, they bring a considerable loss to the purchaser, and disgrace on the original possessor." It is therefore justly considered desirable, that this sort of animal should soon be exploded in neat cattle, as it has been long ago in the variety of light-fleshed new Leicester sheep." Such animals are wholly improper for the purposes of the careful breeder.

In the same view it is further noticed, that "there is another kind which carry plenty of lean flesh, but of a bad quality." The animals in this case "are invariably slow feeders; and may always be discerned by the touch, the flesh being naturally hard." Of such kind, "some are so bad that when put to the best keeping, and continued at it ever so long, they will scarcely have a stone weight of fat either within or without." This sort is also improper in the view of the cautious breeder.

It is conceived that "the perfection of breeding, as far as flesh is concerned, is a great quantity of rich lean flesh in the first instance, which, when the animal is well kept, will soon be covered with a proper proportion of fat." Such too are found to take "not only a shorter time in preparing for the stall than any other, but their beef will also sell at a higher price, being of the very first quality, and of a kind that is eagerly sought after for the best tables." It is not to be supposed that this sort "can never be made too fat; they may be very much so; which is to be prevented when necessary, by lessening the allowance of time in the fattening process.

On the whole, it is concluded that "it is not the animal which has scarcely any flesh when at store keeping, and which, when fed, will consist almost of fat alone, that is the most profitable, either to the grazier or to the consumer: nor is it the animal whose flesh is ever so abundant, if hard and bad, and incapable of having its proper quantity of fat; but it is *that*, which, when at store pasturage, only carries a great quantity of rich lean flesh; and which, by good keeping, may be made as fat as we please." The first of these sorts of stock is considered nearly as unprofitable as the second, though it may on some occasions have been injudiciously recommended.

The true principles of breeding neat cattle teach us, that they should constantly be raised with the view of good flesh or meat, and not offal; when they are for the purpose of the grazier or the feeder; and consequently that all those parts which are supposed inferior, such as the head, neck, legs, bone, and others of the same nature, should be fine and light; but still this notion ought not to be carried too far, as benefit or profit may not always arise from it, nor can a beast be, in many cases, made to fatten on the best parts, without, in

some degree, doing the same on those, which are more coarse and of less value in their sale to the consumer.

7. PROPENSITY TO FATTEN.

The profit of the grazier depends in a great degree on this disposition; for where it does not prevail, much of his food must consequently be expended in vain. As some animals become fat with a very small consumption of food, and others that eat large proportions still remain in a lean state, the circumstances on which the property of fattening depends, can never perhaps be satisfactorily defined. This property is probably in some measure connected with smallness of bone; or it may be that a tendency to fatten arises from some particular circumstance in the internal structure of the body, of which small bones are in general an indication, and that it is only in this point of view that they ought to be considered essential: for they often weigh as heavy, and consequently require as much nourishment as large ones. Indeed cattle ought not only to be easily maintained in point of quantity, but the quality also of the food they consume should be considered; as it is certain that some particular animals will fatten as well on coarse fare as others will do on the most luxuriant. Hence, it appears, that this disposition depends greatly on the shape and breed of the animals, as the practice of Mr. Bakewell, and other breeders, incontestably proves.

It has been stated by an ingenious and able writer of one of the midland Agricultural Reports, that he is inclined to suppose, a large animal, with an aptitude to fatten, will, on fair keep, be as soon fattened as one of a much smaller size; and that though it is thought that cattle stock should be chosen so as to suit the nature and strength of the land, especially where it is of an extremely good quality; yet that he has met with many instances on land of but middling quality, where a large animal that is inclined to fatten will improve as much, and in as little time, as a smaller one; and it is believed, that the large Durham ox did not eat more food to raise him to that enormous size, than some others would consume to bring them to half the dimensions or weight at the same age. Nor is there any reason to suppose that the great Lambert of Leicester, who reached such an amazing weight, had eaten more food than Powell, the noted pedestrian, who was a very thin man. Consequently, the obvious conclusion is, that an animal for the use of the butcher is seldom too large, if it have an aptitude to fatten, and that much in this respect depends on the constitution of the animal.

Many farmers never fatten any cattle except in the grass season, and then only such as they have kept during the winter on straw; but the policy of this practice is disputable on account of the undue proportion of fat thus produced; which, with a view to consumption as food, cannot be considered so useful or economical as the lean.

It has long been an observation among graziers, that "good fat makes good lean"—if there be a superabundance of fat, therefore we may perhaps impute the fault to the grazier, and not to the nature of the breed. Fat meat, though not so fit for common use, is in general considered as affording more nourishment than lean, when the state and vigour of the stomach are suitable for digesting it; and though, according to the common modes of cooking, there may be some loss, yet, by proper attention, such loss may be almost wholly avoided, as is the case in many places. But as the lean of

fat meat will mostly be preferred, the disputes respecting the utility or inutility of fattening animals to the great degree that has often been the custom, must of necessity have proceeded from the want of sufficient discrimination: for, in regard to the goodness of meat of the beef kind, it may be noticed, that that which is afforded from over-fed large beasts is rarely so good as that where they are not too much fattened; and, that when small beasts are too much fattened, the meat is often of an oily quality, and in some cases, as black as that of the horse, so that really good beef probably depends on the nature of the breed, the proper method of feeding, and the age in which the animal is in the most perfection.

The just combination of form, the easy disposition of the animals, and the naturally inherent qualities of the breed or variety, are therefore principally to be regarded by the breeder in his designs of gaining, promoting, or improving this property.

8. HIDE, OR SKIN.

This is a property that should also be attended to in the breed of animals, as it in some measure furnishes the means of determining the disposition to fatten, by the feel which it affords. It is remarked by some, that when it feels soft and silky, it strongly indicates a tendency in the animal to take on meat; and it is evident that a fine and soft skin must be more pliable and more easily stretched out to receive any extraordinary quantity of flesh than a thick or tough one. At the same time, thick hides are of great importance in various manufactures. They are also necessary to the animals in cold countries, where they are much exposed to the inclemency of the seasons; and thus we see in the best breeds of Highland cattle, the skin is thick in proportion to their size, without being so tough as to be prejudicial to their capacity of fattening.

In good cattle-stock, the hide has a particular mellowness, fineness, and sleekiness in handling, which invariably denotes a healthiness of habit. Coarse, rough, thick hides show a hardness of flesh, while a fine texture in the hide is discovered by a fineness and closeness of feel in it; and the shorter and more sleek the pile and growth of the coat are, the more thriving is the condition of the beast; while, on the contrary, the longer and hardier are the more unthrifty. These points and properties in the hides of animals are always to be well regarded by the breeder in selecting them for that purpose. But though hard-fleshed beasts are mostly covered by a thick hard skin, there are among cattle some, which though extremely inclined to feed and get fat, have nevertheless hides of a substance by no means hard, but rich and mellow in the feel. Such are particularly desirable, as protecting the animals well against the severities of climate that are usually taking place. Very thick and very thin skins are equally improper, as denoting hard flesh or tenderness of constitution.

9. MILK.

This is another property which should not by any means be lost sight of by a breeding farmer, as it supplies in large proportions a product very useful to all families. The question of the propriety of having a distinct breed exclusively for this purpose, or only partly calculated for this use, and partly for that of the butcher, has not yet been fully decided; but if such cows as have much propensity to fatten, seldom answer the purpose of the dairy, it would seem that there ought to be a breed almost exclusively for the pail. It has, however, been suggested as probable, that by great attention, a

breed might be reared, the males of which should in every respect, be well calculated for the shambles, and the females when young, produce abundant quantities of good milk; and when they reach a certain age, be easily fattened. Such a breed would, it is supposed, be of the greatest value of any that could be produced: and some of the best English and Scotch breeds, are believed to have nearly attained this point of perfection.

There can be no doubt, that those coarse, more open fleshed, ill-formed cows which have the least disposition to fatten, often give the largest quantities of milk; but the more fine fleshed, better formed sorts which are more particularly disposed to take on flesh, give that which is of a better quality and of a higher and richer flavour, at the same time they are more productive in other respects. They are, therefore, in some situations, and for some purposes, to be greatly preferred as consuming a much less quantity of food, and for other reasons.

It is by no means improbable that a cow-stock might be produced, which should unite the qualities of affording a large quantity of good milk, with a disposition to fatten in a ready manner. For this purpose, it would be necessary to select such young cows for breeding from, as have most of the marks of being well suited for fattening in the formation of their different parts; whilst at the same time a nice and exact attention should be paid in the selection, to the necessary properties of a good milker. The cows should possess peculiar favourableness of form and quality in the udder, and parts connected with it, such as a proper degree of roundness in the former, with considerable fulness or show in their fore-parts; and squareness in the standing of their teats, and a largeness and fulness of what are termed the milk veins. The young bulls to be selected for this purpose, should be such as have been raised from cows properly formed and disposed for fattening. By correctly attending to these and some other circumstances and points, in time, a breed of most excellent feeding and milking cows would in all probability be raised; which would be of vast advantage to cow-keepers of all kinds, as well as to the public in general; as from the present race of milk-cows wanting the form and disposition for fattening, there is a very great loss, especially to the milk dealers in the metropolis and other places, in parting with them, as well as a deficiency of meat for the supply of the public by their not becoming properly fat. The breeder should therefore be careful and attentive to direct his views more particularly to this matter than has hitherto been the case, as a great deal more is, perhaps, capable of being accomplished in this way, than has yet in general been attempted.

In the "Remarks on the Improvement of Cattle," the common notion of a great inclination for feeding being incompatible with good qualities for milking, is ably controverted. It is contended, that inclination and effect, are very different matters; that the former may exist, when the latter is, in the whole or part, overcome by some other counteracting cause; and that when the effect of such preventing cause can be removed, the original tendency may be fully effective. It is argued, "that if it were *assumed*, that a cow while giving a great quantity of milk could not possibly keep herself in good condition; because so great a portion of the food being converted into milk, the carcase could not be properly supported; still "it would be a rash conclusion, to infer from hence, that the same animal could not have a great tendency to get fat;—and that when dried of her milk, this tendency might not soon

produce its corresponding effect: for the effect of the milking quality having then ceased, the other cause, namely, the tendency to feeding, would remain unopposed in *its effects*, and be wholly operative." But such a position should never have been assumed, it is further argued, for, "as well might it have been contended by those who had only a bad race of hard-fleshed animals, that there were therefore no other kind, that would produce a much greater quantity of beef from a given quantity of food."

But to proceed on the ground of fact and experience, it is observed, that "some animals have the power of obtaining a greater degree of nourishment from a given quantity of food, than others of an inferior description: and, therefore, though some of the former may give a larger quantity of milk than the latter; yet their carcases also may, at the same time, be better supported." The author of the above-mentioned "*Remarks*" states, that he has "frequently found cows that are great milkers, to keep themselves at the same time in high condition, to feed with the quickest despatch when dried of their milk, and whose descendants will arrive at the earliest maturity: a practical proof, he observes, that a great tendency to feeding *is not* incompatible with a great tendency to milking;" and adds "that he has many such cows in his own possession."

After suspecting that this controversy had its origin, where only one property could be obtained, and that of early feeding being preferred to great milking, he remarks, "if both can be combined, and that they can," there is the conviction of experience; those breeds which possess only one of them, will not be thought of very highly. "For who, it is asked, that is conversant with such things, does not know the great difference between the value of the produce of two cows, the one a good, and the other a bad milker, if that produce be taken for one year only?"

When "the skill, the perseverance, and the capital required to improve a breed in the carcase only, is taken into consideration, it is not surprising that so few have attempted it;" and when it is further considered, "that the union of great milking with quickness of feeding, required a two-fold labour, we might almost wonder it has been undertaken at all." Yet, whatever difficulties there may be in the business, they are to be overcome, by not neglecting any essential property that may be necessary to the animals that are bred. This was found perfectly practicable, "by selecting those animals that were the most perfect in point of form, in quality of flesh, and so on; and again, by selecting out of those the very best milkers," using in other respects the same care as already noticed. This mode of proceeding in the business is said to considerably increase "the expense in the first instance; but the advantages afterwards derived, are more than a sufficient compensation, as the property of milking is inherited as readily as that of peculiarity of shape."

In what regards "the value of different breeds as milkers only; some have attended solely to the quantity of milk given by each cow, while others have had regard only to the quality. But it is certain that this value must depend on the quantity and quality jointly yielded from a given quantity of food." By the last of which "is to be understood, not merely the same weight; but the same weight of the same kind and quality also;" and in any trial it should further "be given under similar circumstances." The length of time set apart for any attempt of such a kind, too, should, it is conceived, "be at least a whole year; because some breeds will give a great quantity of milk just after calving,

but will not yield that quantity for any considerable time, while others will not give so great a quantity at first, but approximate to it much longer." The number of cows need not be the same, "in two or more cases of trial; but the proper number for the consumption of the proposed quantity of food. For the question is not, whether the produce of so many of one breed, be more valuable than the produce of the same number of any other; but what will be the value of the produce, afforded by a certain quantity of food, when bestowed on the one, compared with the value of the produce afforded by the same quantity of the same kind of food when bestowed on any other; remaining circumstances being as similar as possible."

It is further noticed, too, that "in comparing the value of any breed with the value of any other, in reference to the shambles, it is very evident, that the placing out certain quantities of different kinds of feed, and comparing the increase of weight in each case with the quantity of food consumed, will never determine the question. Because, here, it is said, the question is not, which have paid the best for a certain period; but which have paid the best during the whole course of their lives; the different breeds being killed at that particular age which will give to them respectively the *maximum* of profit." It is, further, a circumstance well known to every practical man, "that there is a certain age which is the most profitable for disposing of one kind; but another age and far different, the most profitable for disposing of another;" and that "some breeds cannot easily be made fat till they are three or four years old; while others are capable of being so at any age we may think proper." It is believed that "the most profitable age for disposing of fat cattle of the improved short-horned breed, is from two to three years old, according to circumstances at the time of sale." In all trials of this sort, it must be remembered, "there are many and great difficulties to encounter in order to render the comparison just; we may, however, proceed with a sufficient degree of accuracy, to determine what breeds are unquestionably the best; and the greater excellence has always been yielded to those which arrive at the earliest maturity."

Such are the conclusions of this very intelligent breeder on these various interesting points, and we recommend them as highly deserving the attention of those engaged in the breeding of animals, as their value rests on real practical grounds.

10. APTITUDE FOR LABOUR.

This is a quality, that in certain circumstances, may be necessary to be considered in the breeding of Cattle Stock. "The question of the advantage that may be gained in this practice, in regard to the increase in the quantity of meat is, it has been observed, "far from having been decided; nor has it been well explained whether injury has not been done in restricting the growth of the animals by this means, more than can be compensated by their labour. It is obvious, however, that when cattle are worked they must be longer in being fitted for the market. But as, from the supposed greater cheapness of rearing and keeping neat cattle than horses, and from some other causes, it may sometimes be necessary to make use of cattle for the purpose of labour, a breed well calculated in this respect must be desirable in particular situations."

Such a breed is most probably to be met with in the fine, clean, active-formed varieties of the North Devon cattle, though some other

sorts answer well for this purpose. Power, tractableness, activity, and speed, are the great requisites in stock for this use; for which cattle are usually begun to be trained from the age of two to three years, constantly working them in such a manner as not to injure their growth or value. But circumstances will be more fully considered and explained hereafter, in speaking of the ox, and other beasts of labour.

11. BLOOD, LINEAGE, OR DESCENT.

These terms are used in the language of the art, and are adopted in analogy to the system of breeding in the race-horse, and imply the quality of the breed, which is very necessary for the farmer particularly to consider in the improvement of his live stock. The term, *blood*, is employed to signify the natural, fixed, and inherent properties of a breed, or kind, as exemplified in their external appearances. Its utility for the purposes of the breeder is, therefore, to enable him to discriminate, with greater nicety and correctness, in his selection of such animals, as are the most adapted to the improvements he has in contemplation.

The descent or lineage of animals is consequently a matter of the utmost importance in point of breeding, which is much better ascertained by the colour than the shapes of them. The same intelligent breeder, from whose remarks we have already selected so much valuable information, observes that, "suppose a number of pure Devon cows to be crossed with a breed of perfectly white bulls; in that case, it is thought probable, that some of the calves would be perfectly red, others white, and that the greater part would partake of these colours jointly. If we were then to take the red heifers produced by the cross, and put them to a Devon bull, it would not," he continues, "be a matter of any great surprise, if some of their progeny, though sprung from red parents, should be perfectly white, and still less, that several should be mixed with this colour; though it would not by any means be so probable as in the former instance. And were we thus to proceed through several generations, this white colour would be less and less apparent in the breed, but would most probably occasionally show itself in some individual or other."

While, on the contrary, "were we to breed from pure Devons only, that is, from those that have been carefully bred for a great length of time, we should reasonably expect their offspring to be of the same colour with the parents themselves; while any deviation from this would be looked upon as one of those changes, which nature sometimes produces out of the common course of things. And what is thus stated is equally applicable," he remarks, "to peculiarity of form, or quantity of flesh."

In continuing the perfection attained by any breed, particular attention is necessary to this as well as other means; for it is observed, that "though animals that are themselves good, and have also been descended from a long race of valuable progenitors, are by no means likely to produce, even in a single instance, a bad offspring; yet it will be no more contended, that every animal produced by the same parents is precisely of the same value, than that the red colour in the Devon cattle is precisely of the same shade in each individual, or that the horns of the Lancashire are exactly of the same length." As "there is a *strong* tendency for *like to produce like*, both in the animal and vegetable kingdoms, so also there is a *slight* tendency to change; and nature, *sometimes* deviating from her common course, produces an alteration which continues to be propagated. And hence will very clearly follow the impropriety of

keeping a bad animal on pretence that it is well descended; an error which some breeders have, it is said, fallen into, if not in judgment, at least in practice." Hence too, " it will appear, that this defective kind of animal spoken of, is generally produced from some mixture of impure blood, or that the breed has been declining through several generations; in either of which cases, it can never be said to be well descended. For, in order that an animal may be well bred, it is not sufficient that we are able to trace it to parents the most perfect of their kind, but every intermediate gradation ought also to be good." It would appear, therefore, that in every material breeding point of view, no animal can be depended upon, unless well bred in all respects, and perfectly good in itself.

It is further observed, in respect to the improvement as well as the decline of breeds, that they are in general gradual, and proceed but slowly through several generations. And hence it is not at all inconsistent to say, ' that animals have *at length* been produced very unlike their original stock ;' and yet, at the same time, there is in nature a strong tendency for ' like to produce like.' But this remark, respecting the slowness of change, refers, it is said, to distinct breeds, and also where any particular family is not crossed with others that are much better or much worse of the same kind; but does not include adventitious circumstances, such as pasturage, climate, and some others. And it is on account of this slowness of procedure, it is said, that so many who have originally engaged in the improvement of stock, have been obliged to expend a considerable sum of money before they could obtain any material advantage; while those who have purchased from that stock, when improved, have reaped an immediate, and even a large, profit."

12. CONCLUDING CIRCUMSTANCES.

The success of the endeavours of the breeder, to whatever sort of excellence his attention may be directed, must obviously in a great measure depend upon the accuracy and correctness of his judgment in choosing those breeds, of whatever sort of live stock they may be, that are most adapted to his circumstances; and in selecting such individuals, both male and female, of such breeds as are the most perfect, and which excel in their different parts and properties; cautiously continuing to breed from them, without ever suffering the least intermixture by the admission of others of inferior qualities: advancing in this way with the nicest attention to such faults or defects, however trifling, as may arise, so as to alter and correct them by appropriate pairing in the succeeding generations. And as an indispensable assistant in this arduous undertaking, he must constantly have recourse to the aid of good and abundant keep at all seasons, with suitable degrees of shelter and warmth for both the old and young stock, so that they may never decline in flesh, or be checked in their growth. Attention to these objects would seem to constitute the great secret of the important art of breeding live stock, which the superior discernment and unwearied perseverance of a single individual has raised to a degree of notice and perfection, that has had the happiest effects in bringing the improvement of our domestic animals to a state of excellence, unequalled in any other country.

All good stock, too, must be both bred with attention and be well fed; and it is necessary that these two essential points in this species of improvement should always accompany each other; for without good resources in keeping, it would be in vain to attempt supporting a capital stock and with such resources it would

be absurd not to aim at a breed somewhat good in quality. However, as the circumstances of but few farmers admit of a total change, improvements of this nature can, in general, only be effected by degrees; for, though they may disapprove of what they have in possession, they may be able only to reject few of the inferior; but by always for the future selecting the best for breeding and rearing, they will gradually render their stock more perfect. Undoubtedly, great improvements in cow-stock may be made, by a proper selection of the best heifers in carcase and milk-bag for breeding stock, but more particularly by a judicious choice of the bull. Indeed, as prime or first-rate stock is in but few hands, and the owners generally ask higher prices than farmers in middling circumstances can afford to give, it would be highly advantageous, with this view, to have proper male stock provided by the proprietors of lands. In this way the letting of male stock in the midland and other districts has had much influence, and it is probably only by some encouragement of this nature that the highest improvement in this department can be attained. Much has, indeed, now been done in this way, in seconding the exertion and following the methods of the professed breeder, and in rendering improved stock better and more extensively known in most parts of the country; yet, as in general, trials will not be made in such matters, until the advantages of them are pretty well ascertained and understood, little can be done in many places where such improvements are scarcely begun, except by letting the common farmer have the use and benefit of such male stock at a tolerably easy rate. By these means much benefit would accrue, not only to the farmer, the professed breeder, and owners of such male stock, but to the country in general; while a fair degree of recompense may be reasonably looked forward to, by the promoter of such useful measures.

The above objects of the breeder will evidently be more or less readily and certainly effected, the more perfectly he is acquainted with, and capable of distinguishing between good and bad animals in the whole; and still further so, where he is able at once to see the most minute faults and imperfections, and to discover the various merits and perfections in them: as without these requisites he can never reach any great excellence in the art of raising or improving live stock.

Having thus discussed the principles, practices, properties, and other circumstances which seem most particularly to demand the attention of farmers and graziers, for the purposes of breeding and improving different sorts of live stock, we may now take a concise view of the nature and circumstances of the most remarkable breeds or kinds.

Section III.—*Different Breeds, Varieties, and Sorts of Neat Cattle.*

The great difference which prevails in most parts, in the nature of neat cattle, arises from various causes, such as their management in breeding, the properties of the pastures on which they are fed, and several other circumstances.

FOREIGN BREEDS OR SORTS.

Though much less attention is bestowed upon neat cattle in other countries than in this, there are large and good stocks of this kind in many parts where the pastures are rich and extensive, as in the Ukraine, Podolia, Calmuck Tartary, Denmark, Holland, and Brabant, some of which, are said to be of the largest size of any in Europe of the domesticated

sort. In several other of those parts, they are likewise large and good, although but little regard is paid to the form and other useful qualities and properties of them. And among the Tartars, and in Abyssinia, the neat cattle have been observed to be of very extraordinary dimensions, but little or nothing is known of their nature or useful qualities. Foreign cattle of this sort are, however, seldom bred, reared, or fed, with that care and attention which is so beneficially practised in this country.

BREEDS, OR SORTS OF THIS COUNTRY.

But though the particular circumstances and sorts of domesticated neat-cattle stock in other countries are but very imperfectly known, in this the breeds and varieties of such stock are numerous and important for their excellencies and uses; so that almost every county, or some particular part of it, has its peculiar breed, variety, or kind, which, in many instances, is peculiarly well suited to the nature of the situation of the land and its herbage: while in others there can be no doubt, but that the store-master and grazing farmer would reap much advantage, in the way of profit, by the introduction of some improved breed in the place of that which they possess, as being more adapted, in its size or other properties, to the kind of keep which is afforded, or the nature of the exposure in which it is placed.

PARTICULAR KINDS.

The more distinguished and valuable breeds or sorts are those which follow; and which have been correctly described by various writers as to their different points and particulars.

1. The old and new long-horned, or Lancashire, Dishley, and Midland breed and sorts.
2. —— Devonshire middle-horned breed and sorts.
3. The old and new short-horned and polled Yorkshire breed and sorts.
4. —— Welsh breed and sorts.
5. —— Polled Galloway, North-west Lowland, Scotch breed and sorts.
6. —— Suffolk dun breed or sort.
7. —— Highland Kiloe, or Scotch breed and sorts.
8. —— Alderney, or French breed.
9. —— Irish breed or sort.

The breeds of cattle are frequently distinguished by the names of the particular districts, counties, or places where they are the most prevalent or perfect of their kind; and it has been usual to arrange them from the nature of their horns, or other circumstances, somewhat in the following manner:

1. THE LONG-HORNED, OR LANCASHIRE, BREED AND KIND.

This breed of neat cattle has many valuable qualities, and has undergone much improvement in different respects, so as to render it very useful in the view of the breeder and grazier in different places. It is distinguished from others, as the name implies, by the length of the horns, the thickness and firm texture of the hide, the length and closeness of the hair, the large size of the hoofs, and the coarse leatheriness of the neck; they are a sort of cattle which are likewise deeper made in their fore quarters, and lighter in their hind quarters, than those of other breeds in general. It is the opinion of some, that in size they are superior to the Suffolk duns, but inferior to the short and middle-horned breeds; they are narrower in their shape, and less in point of actual weight, than the short-horned, though better weighers in proportion to their size, and their beef finer grained, and more mixed and marbled. The cows give considerably less milk, though they afford more cream in proportion to the quantity. They are more varied in colour than any of the

other breeds, but, be the colour whatever it may, they have generally a white streak along their back, which the breeders term *finched*, and mostly a white spot on the inside of the hough. The original colours were red, pied, and brindled, and the finch-backed is the strongest characteristic of long-horned blood, as the bald face is of that of the Hereford, and the smoky face of the Pembroke. The horns of this sort of cattle are either regularly and horizontally extended to the points, or descend from the cheeks until their points meet, when the animal is sometimes styled *wheel-horned*. Occasionally the long horns assume a fanciful direction upwards, bending irregularly at the extremities; sometimes one horn takes its course up, and the other downwards.

Many contend, that the long-horned cattle are the native and original breed of this island. "It is not easy, however," says an excellent writer on this sort of stock, "to ascertain this matter; but it is probable the long-horns have been the inhabitants of the open plain country, whilst the wild breed of the country, or perhaps the Welch and Scotch, possessed the woody, wild, and mountainous parts of the island. However, Lancashire has, it is believed, as much right to be called the mother country for long-horned cattle as Lincolnshire has for the large long-woolled sheep; for though all or most of the cheese dairies in Cheshire, Gloucestershire, and indeed in the greatest part of the midland counties, employ a kind of long-horned cows, yet they are only a shabby mixed breed, much inferior in size and figure to the true Lancashire breed, from whence it is very probable they all originated.

Some, however, think it not improbable that the long-horned breed originated in importations of cattle from the neighbouring country of Ireland; and that bulls and cows brought from that island, having been coupled with the ancient breed of the district, produced the sort of cattle known by the name of the Lancashire or long-horned, and which now occupy a large portion of the pasture lands of England. Others entertain the same opinion from the neat cattle of Ireland being all a sort of long-horned. It is not, however, unlikely that this was the native breed of the north-western parts of this country, as the Devon seems to have been of the south-western.

The long-horned cattle are also very general in the counties of Warwick, Leicester, and several other of the midland districts; and this sort of cattle are to be found in greater perfection in the county of Leicester than in the district whence they take their name, which can only be accounted for by great attention in the one instance, and equal neglect in the other. This circumstance has arisen, it is supposed, from the breeders and graziers of Leicestershire buying the best Lancashire bulls and heifers, for many years before the people of that county were well aware of the practice. The former paid more attention to that kind which was of a true mould or form and quicker feeders; while the latter contented themselves with the old-fashioned, large, big-boned kind, which are not only slower feeders, but, when fed, are not such good beef. In short, the little farmers of Lancashire, tempted by the high prices given them for their best stock, had lost their valuable breed before they were sensible of it.

It is stated that this breed is understood by graziers to be in general rather slow feeders, except that particular kind selected and improved by Mr. Bakewell, which are said to require less food than the others, to become remarkably fat in a short space of time, and to

lay their fat upon the most valuable parts, but to have little tallow in them when killed; and when used in the dairy, to give but little milk. This kind also differs from the rest of the long-horned cattle, in having very fine, clean, small bones in their legs, and also thinner hides. They are a middle-sized, round-carcased, good-looking sort of cattle. The account that has been given of the

IMPROVED SORT,

Which originated with the celebrated breeder just noticed, is, that many years before this period there had been selected from Lancashire and Westmoreland a number of the best-shaped cows; and that certain descendants of these were afterwards purchased on the banks of the Trent, and introduced into Warwickshire by Mr. Webster of Canley, in that county, whence originated the celebrated Canley breed. The previous breed of the county were, it is supposed, long-horned, but far inferior to those introduced by Mr. Webster. The above-noted breeder commenced his labours in this improvement with Canley cows and a bull from Westmoreland, called Twopenny. After breeding in the same line with this stock through a great number of descents, always selecting individuals of the roundest form and smallest bone, he attained the desired success in those respects, and raised that variety which has been since so celebrated for aptitude to acquire external fat. But in the attainment of this end he seems to have in some measure sacrificed the quality of great milking, and rendered the animals less certain in the faculty of procreation. Hence this variety of long-horns is calculated principally for the purpose of the grazier, the original breed retaining its superiority in the dairy.

"There seems to be no opinion formed of any specific difference of quality between the flesh of these and the short-horned cattle; but if we are to judge by analogy from the hides and milk, we may reasonably attribute a more nutritious and substantial quality to the flesh of the former. It has been the custom to deem any presumed specific difference in the quality of the flesh of those animals on which we feed a groundless refinement, and also to attribute any difference to the keep on which they are fattened. Such an idea, however, seems to be erroneous. No keep will equalize the milk and hides, probably not the flesh, of distinct breeds; but we possess an unerring standard by which to determine the former, whilst taste alone decides concerning the latter."

It is noticed, too, that the size of the improved long-horned stock of the midland counties is considerable, as appears by a four-year old steer of Mr. Prinsep's breed, killed some years since, the weight of which was 248 stone, fourteen pounds to the stone, exclusive of 25 stone of fat. The hide weighed 177 lbs. It must be kept in mind too, that there is a mellowness and ductility in the thick hides of such well-bred stock which much enhances their value at the leather market.

The reality of this improvement of neat cattle for the grazier's purpose should, it is remarked, be indubitable, considering the vast prices given for them in the midland grazing districts, higher than in any other; even after making considerable allowance for the suspicion of mere nominal prices. Mr. Bakewell also, probably, first set the example of letting bulls and rams at high prices, which has since proved so beneficial to the country before mentioned.

It is further observed, that Mr. Fowler, of Rolwright, in Oxfordshire, was the earliest and

most successful follower in this improvement: that after beginning with two Canley cows, for which he engaged the bull Twopenny, the produce of which was two cows; and then getting another improved bull from the above excellent breeder, he thenceforth bred entirely from his own stock, the success of which was fully shown in the high prices obtained for the cattle at his well-known sale by auction.

The beautiful cattle at first produced were long and fine in the horns, small in the heads, clean in the throats, the backs straight and broad, quarters wide, light in the bellies and offals, mild, gentle, and quiet in their tempers, from early management, and well disposed to fatten on little food, but not great milkers. For beauty, exactness of form in their parts, and disposition to become fat, they are not to be excelled by any. The improvements made in them since have rendered them still longer and deeper in the carcase, finer boned, finer in the necks, throats, and bosoms, and the backs more straight, wide, and loaded with flesh; the rumps wide, thick, and fleshy on the points, having occasionally a large portion of fat on them, and near the root of the tails, the flanks feeling thick and fleshy, even when only in store order, and handling every where loose and mellow. It was at one time supposed that this breed could only be produced by the best keep; but the contrary is now known to be the case, and it is believed, that in general, such improved cattle will endure less difficulty from hunger, and go on better with common food, than those of a less valuable kind. It has indeed been proved that they keep themselves in good order with less food than any other sort of the same weight. It is supposed that those of a dark red, deep liver colour, or black, with tan-coloured sides, are the hardiest, and have the best constitutions, being capable of enduring the severest weather, of performing the most work, of living to the greatest age, and of becoming fat on such food as would starve those of colours which shew more weakness.

Craven, in Yorkshire, is famed for a superior variety of this breed of cattle, from which probably the Lancashire cows were originally drawn. Good middling beasts of this sort should be well proportioned in their length, depth, and thickness, wide, especially on the rump, with short legs, and thin horns spreading, the colour red or pied, as above, the hide sleek and loose, of a middling thickness, and the weight when fat from nine to twelve score the quarter.

Though this improved breed of long-horned cattle has chiefly been valued for the carcase, which has been the grand object of breeders, as affording more meat, there are many excellent milkers and dairy cows to be met with among the cattle stock of this sort in different places. The largest, best, and most valuable at present is in the hands of Mr. Prinsep, a most distinguished breeder in the above district; but valuable improved stock of this sort are to be met with in many other places in the same neighbourhood. They have a very great disposition to take on flesh and fat, and mostly come to their proof under suitable keep at so early a period as three or four years in the cows and oxen. They probably pay better for the length of keep than any other breed or variety whatever. The young cows are, however, apt to be long dry between having calves. The cattle of this very improved sort produce nearly one third more than others by their hides when killed, and they cut up better and with more profit from their finer and fuller shape in certain parts, which are properties that are well worth the notice of breeders and graziers. Three

convenient sizes of these improved cattle prevail in the native district, a large, middle, and smaller sort, each of which have peculiar advantages in certain cases.

In the plate which is subjoined, the portrait figures of a bull and cow of the real improved variety or breed of this kind of cattle stock are given, in which the different distinguishing points or parts may be clearly seen.

These cattle are remarkable for a greater length of carcase in proportion to their height than most others, and being generally variegated in colour, they have a much finer appearance than many other sorts, whose uniformity of colour is tiresome and unpleasant to the eye.

THE MIDDLE-HORNED, OR DEVONSHIRE-BREED AND SORTS.

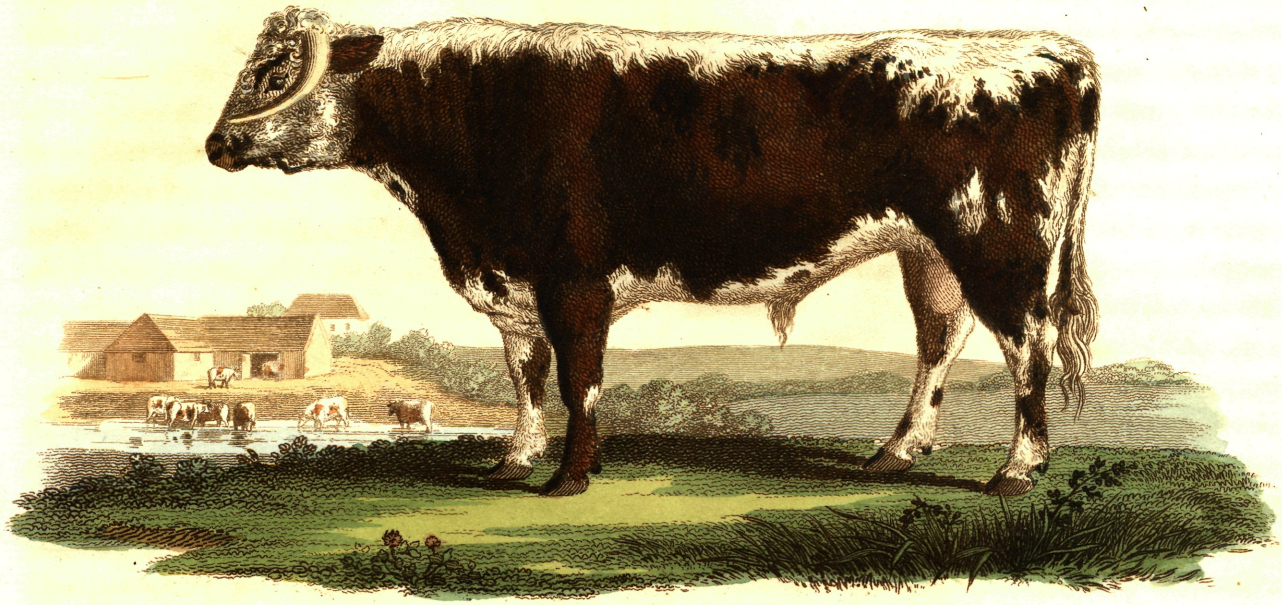
This breed of cattle is much esteemed for its great activity, fine flesh, readiness in fattening, early maturity, and the natural inherent state of purity of blood in which it has remained.

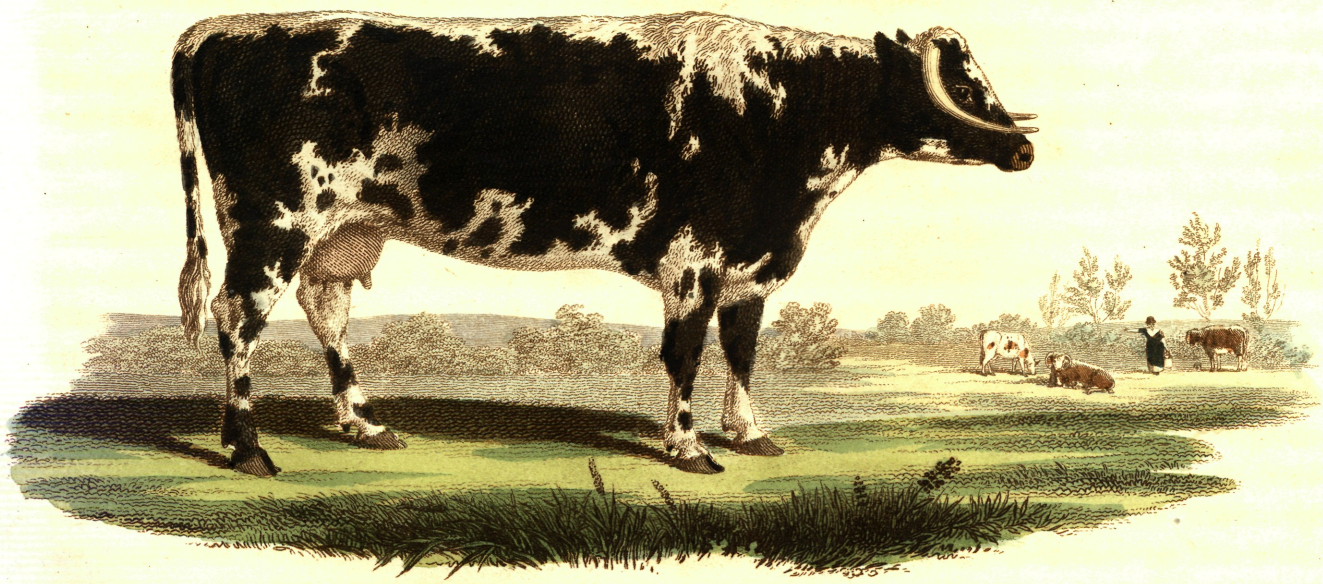
The cattle of this kind are frequently met with in the south and south-west parts of England, as Devonshire, Sussex, Dorsetshire, Hampshire, and Somersetshire. They have also reached as far northward as Herefordshire, where perhaps the largest sort of this breed are to be found. The red cattle of North Devon and Somerset may be considered one of our original breeds, and one which has preserved most of its primitive form: the excellence of which for labour is best proved by the fact that the use of horses is discountenanced where these cattle can be procured. Their high repute as feeders, and the superior excellence of their beef, have been acknowledged for ages; and Mr. Bakewell has paid them the highest compliment they could possibly receive, by declaring to an inquirer that the Devon cattle could not be improved by any cross with other breeds.

This breed, however, frequently runs to too great length of leg, crooked behind or sickle-hammed, and is of insufficient general substance. They are also apt to be *in-kneed*, that is, crooked in the fore legs; a defect analogous to that styled sickle-hammed in the hinder legs. It is conceived that by a nice and proper selection from their own stock, they might be bred somewhat more square and substantial, without at all detracting from their delicacy, shew of blood, or speed. Their powers of labour, as well as the quantity of beef produced from them, might thus be increased, without either debasing their fine qualities, or rendering necessary a larger portion of keep. These cattle have for a century past commanded the best price at Smithfield; but of late years the buyers there have shrewdly remarked, that although blood and fine form are very pleasing to the gentleman breeder, yet substance and weight are, and ever must be, the grand objects at market.

It must also be allowed that the Devons are the speediest working oxen in the country, and will trot well in harness; but in point of strength, they stand in the fourth or fifth class. They have a greater resemblance to deer than any other breed of neat cattle. They are rather wide-horned than middle-horned, as they are generally called: some, however, have regular middle horns, that is, neither short nor long, turned upward and backward at the points. As milkers, they are so far inferior to both the long and short horns, in quantity and quality of milk, that they are certainly not proper objects for the regular dairy, however pleasing and convenient they may be in the private family. They have, however, been used with success at Epping, in Essex, in one or two

Improved Midland Long-horned Breed.





London, Published by Tho.s Kelly, *17, Paternoster Row, June 1, 1822.*

instances; though they are very commonly rejected by the dairies of their own and the neighbouring counties.

It is also observed, that the best bred North Devons, being a hill cattle, are much more hardy and better winterers than could reasonably be supposed from their appearance. The ox in this variety is mostly considered in perfection about the fifth year of his age.

The cattle of the middle-horned breed that are met with in Devonshire were, according to Mr. Culley, in his time, to be found in the greatest purity and of the best kind in the vicinity of Barnstaple, which is still the case; these are of a high red colour; if they have any white spots, the breed is reckoned impure, particularly if those spots run into one another, with a light dun ring round the eye and the muzzle, of the same colour. They are fine in the bone, clean in the neck, have horns of a medium length bent upwards, are thin-faced and fine in the chaps, wide in the hips, a tolerable barrel or body, but rather flat on the sides, with a tail small, and set on very high; they are also thin-skinned and silky in handling, feed at an early age, or arrive at maturity sooner than most other breeds; they are well fitted for draught, both as to hardiness and quick movement, and their shoulder points are admirably well fitted for the collar.

In the more full description of the true cattle of this breed, the head is said to be small, clean, and free from flesh about the jaws; the eye prominent; the countenance deer-like, light and airy; the neck long and thin; the throat free from jowl or dewlap; a darkish orange-coloured list or circle round the eyes; and the same colour on the nose; the ears thin and pointed, being tinged on their insides with the above colour; the horns thin and fine to their roots, of a cream colour, but not tipped with black, growing with a regular curve upwards, and somewhat springing from each other; light in the withers, resting on a shoulder a little retiring and spreading, and so rounded below, as to prevent all appearance of its pinion in the body of the beast; the bosom open, with a deep chest or keel, preceding and between its legs; small and tapering below the knee, fine at and above the joint, and where the arm begins to increase, it becomes suddenly lost in the shoulder; line of the back straight from the withers to the rump, lying completely on a level with the pin or huckles, which are placed wide and open; the hind quarters seated high with flesh, leaving a fine hair-ham tapering from the hock to the fetlock; long from the rump to the huckle, and from the pinion of the shoulder to the end of the nose; thin loose skin, covered with hair of a soft furry nature, which, when in good condition and full coat, is inclined to curl, and becomes mottled with darker shades of its fixed colour, that of a bright blood red, without white or other spots, especially on the male.

The defects in this breed may be considered to be these:—the sudden retiring of the vamp from behind the huckle to a narrow point backwards; the large space between the huckle and first rib; the smallness of the angle inwards, at which the ribs seem to project from the spine or back-bone, giving the appearance in many instances of a flat-sided beast; and in its being so greatly tucked up in the girth, as to display an unpleasant cavity between the keel and navel, the line of which should constantly be found to hold a position as nearly as may be, parallel to that of the back, from the withers to the loins. These beasts are generally well grown, and filled up behind the shoulders.

Cattle of this breed are begun to be broke in for labour at two years old in a gentle and easy manner, when they are sometimes worked until three or four, but mostly till five or six years old, being employed for all sorts of team labour, and are probably more perfectly adapted for the purpose than any other sort.

The bulls of this breed have too commonly imperfections in their forms, which are not met with in either the cows or oxen, the make of which is handsome; such should therefore be selected as have the above shape of parts as much as possible, the neck never being to be found fault with, though rising considerably thick and high on the crest, if without fleshiness at the insertion with the head. Occasionally good milkers are met with among the cows of this sort, though they are in general but indifferent in this respect.

Lord Somerville, a native of, and resident in, the county wherein these cattle are bred, speaking of the red, or Devon sort, has observed, that in describing the breed as they are really met with in common, conclusions are not to be drawn from the shape and size of the bulls, but from the usual quality of their stock. Certain it is, that individual handsome bulls are not unfrequently met with in other breeds, but it is equally true that the whole produce being this sort, stands the acknowledged favourite, or among the very first, in the great market of the metropolis, where prejudice is quite out of the question. Further, in deciding on their real merit, the annual produce afforded is to be regarded; which, in oxen whose superiority of flesh, agility in labour, and what is called blood, will be found the proper standard for judging of the bulls that got them. The following may be taken as the description of a very handsome shaped individual:—the horn is neither seen drooping too low, or rising too high, nor with inverted points; tapering at the ends, but not too thick or *goary* at the roots; the colour yellowish; the eye clear, bright, and prominent, looking well behind, and displaying much of the white; occasionally a variation of colour round it. It has a forehead flat, indented and small, which is met with almost universally in the breed, and indicates much blood: cheek small, and muzzle fine, which if the forehead be so, the muzzle is so too: the nose of a clear yellow or mottled: (a black nose should be constantly avoided; as though such may occasionally bear work and die well, yet it not unfrequently shows a bad constitution, or such as provincially turn scourers or *skinters*, especially when the cast of the coat is in colour too pale: high and open nostrils:) the bulls in this sort sometimes said to be too *throaty*, or to have the skin pendulous or too profuse, and the hair being curled affords an appearance of coarseness to the head, not met with in the improved long-horned, or new Leicester, breed of bulls when properly trimmed: the neck perhaps thick and goary, in the opinion of strangers, which, however, in the oxen of this sort are not to be censured, as they are thus enabled to work as they do.

In common, the bulls are in relation to the oxen, not of a large size; and it should be noticed in regard to size in general, that nature acting by food and climate, or exposure, is imperious, and will produce animals proportionate to such causes in the proper course of time, whatever the original size of the bulls and cows may have been. The neatness of form and vigour, and energy in labour, which distinguish this breed in a great degree, if not wholly, arose from breeding by heifers, and year and two year old bulls. Compared with the horse, the shoulder is considered low; it should answer to the general thickness

of the animal—on no account projecting. If a bullock be in-kneed, or bending inwards to each other, the point of the toe will be out; the point of the shoulder the same, and the beast must be hollow behind the withers, which, in an ox for feeding, is an incorrigible point, and he must, of necessity, be a slow worker. The bosom is not sharp, with a loose, pendulous dewlap; but wide in form, and mellow in handling. In purchasing an ox, great attention should be paid to the breadth of the bosom, and between the fore-legs, standing quite wide, which should be like straight pillars supporting a great weight. Much in buying is lost or gained by having regard to this point; it is not for beauty of form only, but implies strength and speed; a proportionate breadth of breast giving wind: and therefore of so much importance to a working ox. The legs are straight; and the more blood the ox shews, the smaller will it be. The circumstance of this breed shewing more blood than any other in the kingdom has been noticed by many persons ignorant of cattle, but deeply skilled in horses. The leg should be neither too long nor too short: an undue length to be particularly avoided.

Very much of a bullock's proof is allowed, on all hands, to depend on the size of the rib, rotundity of the barrel, and mellowness of the skin. These are the first points to handle in a lean and in a fat ox. The two hind ribs should be bold and prominent, as well as widely independent of each other: the skin rising easily from them, mellow and elastic, affording room to lay fat on below it.

In buying in a lean ox, a person would do well to handle him on both sides; it often happens, that the frame or barrel is not equally round on both; one being evidently to the eye and hand flatter than the other. The hips, or pins, lie so high as to be on a level with the back, either in the fat or lean state. The older the animal, the lower the upper flank drops, and consequently, the higher the hips appear. In this point of the upper flank, a skilful judge will discover much of the inward properties of a fat bullock. The hind quarters from the pin to the catch, or point of the rump, should be long and well filled up: in the estimation of choice judges, handling the centre of this space determines more of the substantial quality of the flesh and fat of a beast, than the prominence of fat so much admired by bad judges on the catch of the rump. The setting on of the tail should be on a level with the back, something elevated, nothing depressed: size long, small, taper, and with a round bunch of hair at the bottom: the tail, as in a horse, denoting much of high blood. It is noticed, that in this sort the gaskins are not too much cut away, nor, as in the Holderness breed, heavy and loaded; and it should be always kept in mind, that these beasts are not bred for inactivity, but for wind, vigour, and strength; for though a breadth in the bosom, inasmuch as it is essential to wind, in a working animal, is beneficial, yet a load of flesh on this hind part tends nothing to activity; and, being of second-rate quality, is not desirable.

With relation to the point of skin, they are among the thinner, rather than the thicker, classes. It is very rarely that an ox of this sort is found with a hard or wiry skin. Much depends on colour: the shades most admired are the mahogany; and the more glossy, if smooth, the better. Those with curled hair are deemed excellent provers; and a very glossy mahogany skin, paler or lighter, with curls like ripples of wind on a smooth millpond, is held in the highest esteem. It is difficult to say which of these is the best; all turning

out such numbers of good fat oxen. The paler shades, if the eye be clear and good, will bear hard work, and prove as well as any. This rule alone is absolute—that a pale skin, hard under the hand, with a dark and dead eye, denote a *skinter* in hard work, and rarely, under any indulgence, a good prover. With respect to the lower flank, and the cod, they do not, it is supposed, deserve that attention which many persons bestow on them, who think such points of prime importance. The graziers like this breed best at five years old. The worked-out steers of the vale sell for more, at five years, than at six: but six is the proper age. At eight, nine, and ten, they are going back in all their points; and in their value after seven. No ox should be kept after this period, or at most after eight. They are yoked at two or three years old, and lightly worked—labour increased at four, from which period to six they are full worked. When worked, it is supposed, they attain a larger size than when not worked, they finish their growth mostly at six years old, but the larger sizes grow the longest.

Lord Somerville has found in practice, that the pole and yoke form the true lever of an ox in draught, as the animal can draw a greater weight in that manner than in collar and harness, especially in a steep country. His Lordship states, that the bullocks never go home in the middle of the day; but hay is carried into the fields. All the calves of this breed are reared conformably to his Lordship's practice.

It is said, that these oxen are not parted with by the tillage farmer, until the finishing of the barley-sowing, and, in many cases until the turnip ground is once stirred, yet they are grazed fat, to the average weight of forty-five score, in six or eight months: those kept on till the beginning of the ensuing year, fattened on hay alone, which, in the grazing districts of the west, is held equally nutritious with any sort of corn, stand the drift to the metropolis without waste. There are many instances of marsh-feeding heifers, bought early in the first or second spring months quite poor, being made fit for the butcher by the middle of summer, and in August making uncommonly fine beef.

The station of this breed begins at Barnstaple, and is traced by the line of the river Taw, as high up as Chumleigh, then to Tiverton on the Ex, and nearly to Taunton: then, straight to the sea, over the eastern boundary of the Quanton hills, to Stoke Courcy; from which place, on the eastern extremity, to the mouth of the Barnstaple river on the western, including in the whole to the length of forty-five miles, and to the breadth, across from Tiverton to Minehead, of twenty-two. To the east of this range, the breed gets into a mixture of the Gloucester, Welch, Upper Somerset, and others, being a varied dairy sample: and more to the west, a Devon, verging on the Cornish stock. To the south, the variety of the horns in that direction is found—coarse, with a good deal of white and brown, with black and white mixtures, of uncertain properties. Exmoor is the highest-point of the district thus defined, the country shelving from it in every direction, the source of all the rivers, and the head-quarters of all the cattle; at Brampton and Wyvelscomb, they are found in great perfection.

These are well-proportioned, fine-looking sort of cattle, and which have the greatest similarity to each other, perhaps of any kind whatever, a circumstance arising, most probably, from breeding only from such as are wholly of the proper red colour, and discarding altogether any that may have white on any part of them. They are a kind which, in the cows and oxen, are almost wholly without any sort of leathery coarseness about them, although the

Improved Devon Middle-horned Breed.





London, Published by Tho.s Kelly, *17, Paternoster Row, June 1, 1822.*

bulls are far from being free from these, and other faults and imperfections in their form.

Though the cows have been seen to be in general short milkers, in some dry thin situations of the pastures, they have been found to be by no means bad butter or cheese cows.

Where these cattle are raised with more thickness in the hide, somewhat shorter and more full in the leg, with a little more length in the body, they have been found, in the oxen, to be less tender, and to stand working better, and in the cows to be better formed for affording milk. They have a greater weight too than the common breed, as in the oxen generally from about 550 to 850 pounds and upwards, and in the cows from about 430 to 550 pounds or more.

They are a kind of cattle which are capable of standing stall-feeding in a better manner than many other sorts.

It may, on the whole, be concluded, when all the properties which should attach to an useful breed of cattle are considered, that the middle-horned, as a general sort, come much nearer to perfection than any other in this country. They are of a good size, well-formed, and in disposition to fatten, they are probably much on a par with the short-horned, and generally superior to the Suffolk. As dairy cattle, they are also as valuable as any that fall under the description of quick feeders; for although they give a less quantity of milk than the Suffolk or the long-horned, it is said to be of a richer quality in its nature.

It is, therefore, a most valuable and useful sort of neat cattle stock, in many different intentions, especially in its late more improved state, by which its beneficial properties have been much increased and rendered more generally applicable.

In the plate which is subjoined, is shown the portrait figures of a bull and cow of the true breed of this sort, in which the particular points or parts that distinguish them are correctly displayed.

SUSSEX AND HEREFORDSHIRE VARIETIES.

In these varieties, which are a larger sort than the above, the colour is stated to be deep red, with fine hair; rather thin skins; necks and heads clean; horns neither long nor short, rather turning up at the points; well made in the hind quarters; wide across the hips, rumps, and surloins; narrow in the chines; tolerably straight in the backs, but the ribs or sides lying rather too flat; thin in the thighs, and bones not large. An ox, six years old, when fat, will weigh from sixty to an hundred stone of fourteen pounds, and often much more. The fore quarters are generally the heaviest. The oxen are mostly worked from three to six years old, sometimes to seven, when they are turned off for feeding.

SUSSEX.

This variety, or breed, though not so large as the Herefordshire, exceeds those of most other districts, being held in high estimation for beef and labour, and, in some degree, for milk. It is a mixed breed or sort, with which equal pains do not seem to have been taken in their improvement as with the Herefordshire kind. The cattle may be found in a state of original purity as to form, in their native district. This is a sort which is generally red or brown in colour, and which shows much blood; wide and middle-horned, the points turned upwards and backwards; of various sizes, but the larger somewhat too coarse in the bone, and of insufficient width or substance for their great depth of carcase. It is thought that they need no cross with other breeds, having all the materials of improvement within themselves, un-

less, perhaps, a Herefordshire cross might be useful in some, to remedy the excessive fatness. Their speed is great, and it is doubtful whether even the Devons are in that respect much superior; they are, at the same time, equal in power in the cultivation of the heaviest clays, and in draught over the deepest roads; in temper, somewhat quick, like the Devons. These different varieties of the middle-horned breed of cattle, for their particular excellencies, claim the attention of breeders, and become objects of national interest, through the country, as beasts of labour.

When this variety is compared with the Devon breed, the beasts rise to much greater weight, and, of course, have far more strength for work. They are not so thin, narrow, or sharp, on the top of the shoulder, or bladebone, nor drop so much behind it; nor do they in general so much project in the point of the shoulder, nor stand so narrow in the chest; their chines are not so thin, nor are they so flat on the body or barrel; they do not hang so much in the flank; they are equal in their property of fattening, and of equal value to the grazier; their hides not quite so thin or soft, but much the same in the mellowness of their feel; not so wide on the hips, nor so clean in the head, neck, and horns, nor so small and light in the bone, but altogether a highly valuable variety of neat cattle stock.

It is, however, a sort of cattle so similar in appearance to the Devonshire kind, as scarcely to be distinguished, except by good judges; but they are more darkly coloured, have more bone, are thicker in the hides, and not so lively. They are in common a very perfect sort of cattle; for though they have been described as too flat in the rib, and narrow in the chine, these are by no means peculiar faults in them, more than in other sorts of such stock; while when too much rounded or flat in the above parts they are great defects, as much weight is lost in the former case, and in the latter there is a want of due thickness in the whole, which renders them deficient in weight. In the oxen of this sort the weight is usually from about 800 to 1,350 pounds and upwards.

The oxen of this kind, are considered chiefly valuable for the purpose of labour, and are not improperly formed for such use, but they have less activity and lightness in their movement than those of the Devon kind, being more strongly made in their shoulders and fore parts.

The cows are not considered large milkers in their native district, but the milk is supposed to be rich and good, both for butter and cheese, but especially the former; and the quantity, on the whole, is more than the average proportion of some districts.

In the plate which is subjoined are given portrait figures of this and the following variety in their true and real states.

HEREFORDSHIRE.

It has been conceived, that the Herefordshire variety, which at present is a mixed breed, was originally of the Devonshire sort; and that "its great size is probably derived from an intercopulation with the heaviest of the Welch or Shropshire breeds."

The characteristics of this variety are, the countenance pleasant, cheerful, and open; the forehead broad; eye full and lively; horns bright, taper, and spreading; head small; chop lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide and level with the spine; quarters long and wide at the neck;

rump even with the general level of the back, not drooping, nor standing out and sharp above the quarters; tail slender and neatly haired; barrel round and roomy, the carcase throughout deep and well spread; ribs broad, standing close and flat on the outer surface, forming a smooth even barrel, the hindmost large and of full length; round bone, small, snug, not prominent; thigh clean and regularly tapering; legs upright and short; bone below the knee and hough, small; feet of middle size; cod and twist round and full; flank large; flesh every where mellow, soft, yielding pleasantly to the touch, especially on the chine, the shoulder, and the ribs; hide mellow, supple, of a middle thickness, and loose on the nache and huckle; coat neatly haired, bright, and silky, colour a middle red, and a bald face.

It is equal if not superior to the Devon and Sussex kind, in disposition for feeding or fattening, and in fitness for working is by no means inferior to either of them. The beasts are larger and more weighty, though equally complete in their shape or make, mostly more wide and full over their shoulders or chines, as well as breasts or briskets, and likewise in the hind parts of the rumps.

In the true sort of this variety, no projecting bone in the point of the shoulder is met with, which, in some others, forms almost a shelf, against which the collar rests,; but, on the contrary, the shoulder tapers off; there is a great breadth before, and the hind quarters are equally weighty; the tail is not set up high; there is a great distance from the point of the rump to the hip-bone; the twist full, broad, and soft; the thigh of the fore legs, to the pastern joint, tapering and full, but thin below the joint, the horn shoots sideways a little, and then turns up thin and tapering; feeling very well; mellow on the rump, ribs, and hip-bone: quality of the meat not hard, but fine as well as fat; little coarse flesh about them; and a great disposition to marble with fat. Experiment has shown that the favourable disposition to take on fat in these large cattle is such, that they will become fat sooner than either of the other two sorts. Some think this variety of cattle are better formed for fattening than working; that they are large boned, thick legged, quite unlike the above sorts, and, consequently, that they are slower in their motions; but the trials that have been made of these beasts in the same teams, in ploughing and carting, with many of each of the other sorts, have fully proved the superiority of this variety; though on the average, they are found to outweigh the latter of the above sorts. In common, the cattle of this variety are more complete in their form, their several parts brought up more to a level, and the intervening spaces are more perfectly filled than in the other sorts. A middle-sized ox of such a shape, free from any sort of hardness of flesh, with legs devoid of gumminess, from knee to hock downwards, and with clean bone and sinew, will, it is supposed, be the fittest for work, and the most generally saleable in the fat state.

The Herefordshire, as well as North Devon, varieties of this breed are a very superior sort of stock, both for the purpose of labour and for that of grazing, being not only clean, strong, and well made, but affording quick proof under the feeding system. The females in the Herefordshire sort have been found to fatten better than any other kind at three years old, except the spayed heifers of Norfolk. The oxen, when six years old, and fattened, will in general weigh from 60 to 100 stones, of fourteen pounds, the fore quarters being generally the heaviest. Being steady and active, as well as capable of great exertion in harness,

they are peculiarly adapted to the purposes of the team: they may be worked from three to five or six years old before they are fattened.

It has been remarked, that of late years considerable coarseness of bone has distinguished even the best Hereford cattle; a circumstance which is of trifling importance, as they have proved themselves of such superior excellence that no possible cross could in any way improve them. Breeders of this variety should reflect on the importance of preserving the old blood in a state of as great purity as possible, as they possess the most valuable breed of cattle in the kingdom for some purposes, and have hitherto been very judicious and fortunate in nicely blending the elements of such a variety; but they ought not to forget that by further mingling and crossing with inferior stock, they may, by degrees, recede from the great eminence they have attained. Should, however, a cross become really necessary, from too much coarseness or over-size, the Devonshire or Norman bulls in such cases are to be selected.

The distinguishing qualities of Herefordshire oxen are the great produce of beef, quick feeding in proportion to their growth and size, and the union of strength and speed in labour. With respect to the most profitable return in quantity of beef, it may be presumed, no breed in England can stand in competition with this, and they have been accordingly the most successful at the annual prize shows. They also command the first price alive or dead.

Though the short horns are of larger size, they do not commonly feed so quickly as the Herefordshire sort, which vary very conveniently as to size, but require to be well kept. They are most powerful draught oxen, being speedy enough for any work, either in the plough or cart, and generally walk sufficiently quick. They are docile and tractable, and if trained with temper and kindness, will drive to an inch with reins: but "as milkers, they have nothing particular to boast."

This is a sort of neat cattle which partakes much of the mixed nature of the middle, long, and short-horned kinds; but in which the horns are generally wider, and do not rise upwards so much as in the Devonshire and Sussex cattle. They have, for the most part, white faces, and throats, with some white on other parts, but their prevailing colour is chiefly a dark red or brown, there being few of any other colour. Their appearance denotes strength and utility, but is not remarkably showy. In the hide there is a sort of medium between the thick and thin kinds. They take stall feeding better than those with thick hides, but not equal to those with thin ones. They succeed better in moist situations and exposures than the latter, but not so well as the former. From their properties and size, they require rich and good keep.

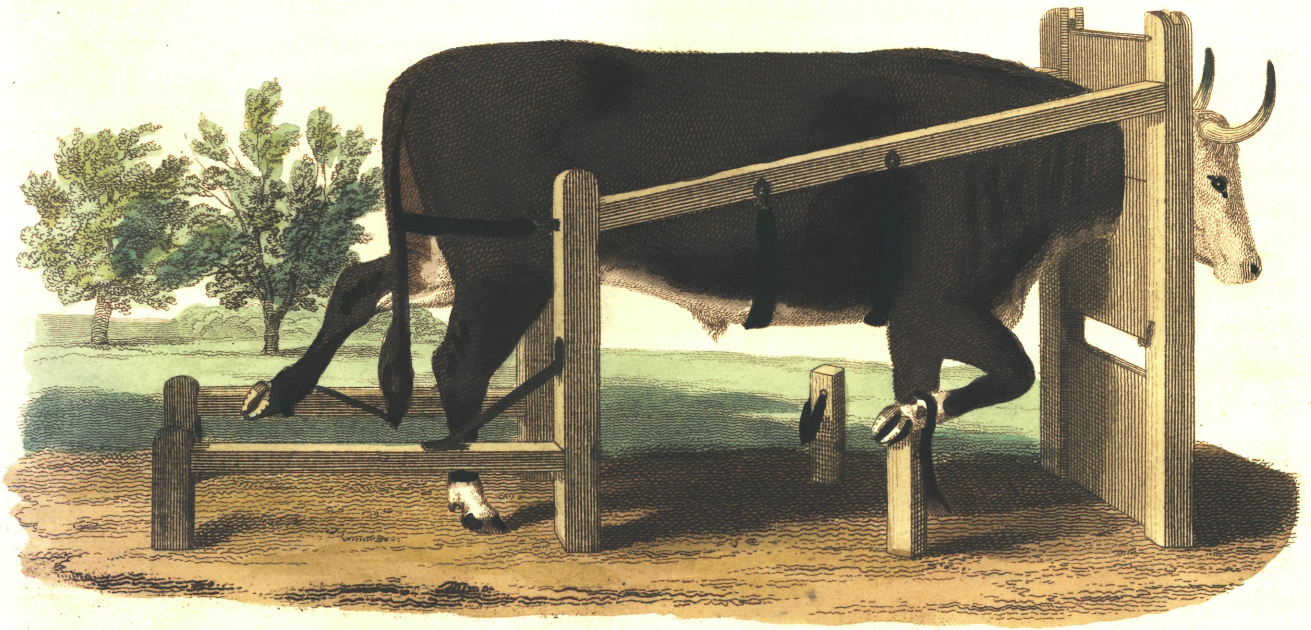
They have a good form for labour of the more heavy kind, but have less activity than the Devons, and perhaps some other sorts. They are short in the leg, and somewhat so in the length of the whole body; and have more bone than some finer sorts. They have a weighty, fine-grained, well-marbled flesh, and a greater regularity in the mixed proportions of fat and lean than is the case in some other sorts; the chine is somewhat raised near the shoulders, but with sufficient breadth, which causes it to be thick and heavy. They are round in the hucks, with good width from each other, and sufficiently laid over with fat. The rump part has a good form, and the thigh is properly heavy. When killed at an advanced age, however, they die patchy in their fat.

The cows are not valuable as milkers in any

Improved Varieties of Middle-horned Breed.



Sussex.



Herefordshire.

London, Published by Thos. Kelly, *17, Paternoster Row, June 1, 1822.*

great degree, being rarely found in use for that purpose; but the oxen are well suited to and in high estimation for the grazier; the breed may therefore be considered greatly useful.

The oxen appear to be in perfection at about five years old.

This sort of cattle are larger than any other kind, with the exception of the Yorkshire short-horns.

The largest kind are of the weight of from about 980 to 1400 lbs.

The cows, from about 700 to 980 lbs.

It has been imagined that "the old Gloucestershire reds and browns were middle-horned, showing blood, and resembling, in a great degree, the South Devons, but of a more square and substantial form. They are supposed to have been a mixed breed which shewed much Welch blood, and were, it may be presumed, more apt to fatten than milk, since they have given way to the long-horned sort in that dairy country. It would be difficult 'now' to find any genuine specimens of this variety."

The Kentish homebreds, which are raised from dairy heifers, are also, considered to be, of a mixed breed, the Sussex generally forming the base, crossed with other proper sorts. It is noticed that a variety is thus raised of excellent butter cows, of a small size; and it is suggested to the breeders of that district, whether it may not be worth while to establish and render the breed permanent.

THE SHORT-HORNED, OR YORKSHIRE BREED AND SORTS.

The short-horned breed of cattle differs from the others according to the name by which they are distinguished, in the shortness of their horns, in being wider and thicker in their form or mould, consequently feeding to the most weight, in affording by much the greatest quantity of tallow when fattened, and in having very thin hides and much less hair upon them than any other breed, except the Alderney: the most essential difference, however, consists in the quantity of milk they give beyond any other breed, there being instances of cows of this breed giving thirty-six quarts of milk in the day, and of forty-eight firkins of butter being made from a dairy of twelve cows; but the more general quantity is three firkins the cow, in a season, and twenty-four quarts of milk in the day. Their great quantity of milk, the thinness of their hides, and little hair, are, probably, the reasons why they are tenderer than all the other kinds, except the Alderney. They are found to consume more food than any of the other breeds, which cannot be wondered at, when it is considered that they excel in three valuable particulars; affording the greatest quantity of beef, tallow, and milk. Their colours are much varied; but the generality of them are red and white mixed, or what the breeders call *flecked*, which, when properly mixed, is a very pleasing and agreeable colour. They are chiefly to be met with in Lincolnshire, and the eastern parts of the counties of York, Durham, Northumberland, and Berwick. This breed, originally imported from Holland, is frequently called the Dutch, and sometimes the Holderness breed, from a place of that name in Yorkshire, where it would seem to have been first established in this kingdom. The best and most perfect of this sort of cattle are now to be found on the banks of the Tees, and that neighbourhood.

A late writer, in his account of this breed, states, that, destitute of the exertion and agility of the middle-horned sort, they are not so well adapted for the cart or the plough: considering their size and the quantity of

food they consume, they must be considered as inferior to any of the above-mentioned, and, when compared with the Suffolk duns, greatly so. Much attention was formerly bestowed by the graziers in the midland districts on the improvement of the long-horned breed of cattle; and a great number of eminent breeders have more lately embarked in the laudable undertaking of improving the short-horned breed; and from their knowledge, assiduity, and exertions, much has been expected and much done. Mr. Charles Collins, at Ketton, near Darlington, in Yorkshire, is supposed to have been long in possession of the best breed of short-horned cattle in England, and to have lately produced an improved sort of them, but which are not in so good repute for milking, though of large size and fine appearance. Other breeders have since raised an excellent sort of these cattle for milking as well as feeding, and most other purposes.

It is said by a distinguished writer on live stock, "that there are many reasons for thinking this breed has been imported from the continent: first, because they are in many places called the *Dutch* breed; and secondly, because we find very few of these cattle any where in this island, except along the eastern coast, facing those parts of the continent where the same kind of cattle is still bred, and reaching from the southern extremity of Lincolnshire to the borders of Scotland. The long-horns and these have met upon the mountains which separate Yorkshire from Lancashire, and by crossing have produced a mixed breed called *half-long-horns*, a very heavy, strong, and rather useful kind of cattle; but it is not found that the one kind has spread further west, nor the other further east. This breed, like most others, is better and worse, in different districts; not so much from the good or bad qualities of the land, as from a want of attention in the breeder."

The northern short-horned sort is the largest breed in the island, the Herefords being the next: they are an original breed; but whether those of the northern counties are so or not cannot at present be ascertained.

This sort of cattle, opposite in almost every respect to the long-horns, has great depth of carcase; and with ample substance, large bone, and thin hide, give much milk, which, however, is not distinguished for its richness. They are not of first-rate character as labouring cattle, which, nevertheless, the common variety seems to promise by their form. The coarse, square, *Dutch* beefy breed, is considered the basis of this breed. In many parts of the north they remain still coarse, and by no means equally disposed to large milking. The common Lincolnshire cattle of this kind are coarse in the head and horn, large boned, high upon the leg, and *ragged-hipped*. They are equally coarse internally, but produce flesh in great quantity. The Lincoln neat cattle, in fact, plainly demand an improvement, such as the sheep have received in the Dishley breed.

It is conceived, that the most accurately marked and permanently distinguishable varieties of the northern short-horns, are the good common, and Lincolnshire sorts. "Culley tells us, "that amongst the old stock there were some with black flesh which would grow but never fatten, provincially called *lyery*: these were to be known by the rotundity of their shape, approaching in many respects, that of an ill-formed cart-horse." The extreme coarseness and size of the northern short-horns, led to the introduction of Norman, or Alderney bulls probably at some period of the last century.

There exists in no other country so excellent

a breed of cattle as those of this true sort, including all the useful properties. In one, perhaps, the most important respect, great milking, they are even without rivals: their beef is finer than that of the old short-horned breed, and they fatten much earlier and quicker, conveying still a vast depth of natural flesh, and tallowing within in the first degree. They have both speed and strength enough for labour, and their shoulders are well formed and well pointed for draught. Being beautifully variegated in colour, spotted, striped, sometimes *sheeted* red and white, they make fine park stock. From their superior quantity of milk, they rival the best long-horns in the cheese and butter dairies, and for suckling are unrivalled. It may be presumed, they are at least equal to the Hereford in the stall in all points: and there seems but one respect in which they are, in any considerable degree, inferior to any breed which can be named, which is fineness of flesh: in which particular it is obvious, they can never equal certain other breeds, without the entire overthrow of their *Dutch* basis, by a repetition of the Norman or some similar cross which would go to destroy the present superior breed. An occasional mixture, however, of Norman blood may keep the Holderness stock sufficiently fine, and prevent its degeneration on the other side: or a selection might be made of very elegantly shaped and fine-boned cows, with the view of improvement. These true sorts are well known as the stock generally kept by the London cow-keepers. They have small short horns somewhat in the shape of a half ring, rather a long plain head, fine skin, the legs seldom too long, the carcase large, but compact, good back and loin, the general figure rather square. They are not the kind of stock for short keep, however small their size: indeed they are known to be great consumers. It is necessary, however, that this high character of these cattle should be received with considerable reserve: it relates to the cows chiefly, and to a selection of the oxen to what they ought and might be, rather than what they generally are.

The first object, in respect to the improvement of the ill-formed part of such stock is, to shorten the legs, and this might be effected by a conjunction of the best Teeswater and other good bulls with 'properly' selected short-legged cows. It is thought "that the best and quickest feeders of this breed are not remarkable for milking. The Tweed side short-horns are a valuable variety of the Teeswater kind."

It is also believed, that "the Northern *half-long-horns* are the immediate produce of a conjunction of the long and short-horns, which must, of necessity, frequently happen upon, and in the vicinity of, those mountains which separate the native district of the two kinds. The horns of this variety generally run out pretty straight and even, unlike those which are called middle or wide horns. They are a large and long breed of cattle partaking equally, as may be supposed, of the qualities of each sort, and thence ought to be good dairy cattle as uniting quality and quantity of milk with size. They are not so permanently established, and generally known as their originals."

Many of this kind of cattle are very perfect in their nature, being more fine in the chap, with less coarseness under the neck than most other sorts, but they sometimes stand a little high in the leg, and are occasionally rather thick in the shoulders; in flesh they are weighty, with a full chine, the hucks are large, and the rump and loins heavy, though somewhat short. In consequence of their large size, they demand good keep and proper length of time in feeding; but though the beef of them be thought

by some to be more coarse, and not so well marbled as in some other breeds, they very commonly die fine in the quality of it; and it having the excellent properties of being very juicy, and taking salt well, greatly fit it for the purpose of provisioning our ships. They are, therefore, in suitable situations, probably, a most profitable and advantageous sort in most points of view.

The cows, though in common such deep milkers, when not employed in that way, become readily in the fat state, paying well for their keep; this is particularly the case in some of the more improved sorts.

The value of this kind of cows is now beginning to be better known, and more in demand for the butter dairies than has been hitherto the case, as they are found to give so much larger quantities of milk than other sorts; which besides being used in this way may be turned to much account in the support of a larger number of hogs, as though more butter may not be given soon after dropping the calves, there is a much longer continuance of it, which is a great advantage, as the consumption of food is not very materially different.

TEESWATER IMPROVED SORT.

The Teeswater or Durham improved variety of the short-horned breed of cattle has much resemblance to the best of the other sort, but is larger and much heavier, being a well-made, thick, and weighty sort. It is a variety, which is capable of rising to a great size and state of perfection, as is proved by the celebrated great ox which was exhibited in different parts of the kingdom, which was of this kind, as well as by many other instances of extraordinary size and dimensions. The bulls and oxen of this sort come at an early period to fifteen or sixteen score the quarter, being in some cases nearly all white with black spots: but they will not ripen and fatten so well as the long-horned sort, and unless they are well fattened they will not fetch so much from the butcher, as in the half-fed state, they are somewhat coarse and unkindly in their nature.

They are a sort which are very fine handlers, and which have a great disposition and aptitude for taking on fat at an early period. Their colour is commonly red and white, or white with a little red or roan about their necks. They are a variety of the short-horned cattle which have great value, utility, and advantage in different cases.

There are many instances of these cattle rising to very great weights, as from 150 to 168, and even 200 stones; affording from 11 to 16 stones of tallow and upwards, and weighing in the hides from 9 stones to 9 stones 11 pounds.

YORKSHIRE POLLED SORT.

The Northern or Yorkshire polled cattle have the same qualities as the short-horned, carrying vast substance; and some attaining great size, although in that particular they are most conveniently various. In the opinion of some they are a most excellent breed, and will merit improvement with the view of labour, by a selection of the finest boned and most active individuals. From the shape of these polled cattle they hold a strict affinity it is supposed in all respects with the short-horned, amongst which they are found; and it seems that various breeds of horned cattle are attended with hornless, but perfectly congenial, varieties.

The excellence of these polled cattle is shewn by the fine crown-pointed tops of the heads, which should be particularly regarded

Improved Durham Short-horned Breed.





London, Published by Thos. Kelly, *17, Paternoster Row, June 1, 1822.*

in selecting the bulls, as indicating disposition to fatten, and tending to give more of such a state in the foreheads of them, by which a similarity is the most likely to be afforded in their produce, as it is constantly noticed, that where there is any mark of a bullish kind in such parts of cows, it is a certain indication of their being very deficient milkers. Some of this as well as the other sorts have the fault of having extremely thin hides, but which is often a sign of long continued milkers under good keep. Being large, they demand better food, and more time in bringing them to the proper state than many other breeds and varieties, and they should not be fed off at too early a period. They are much in request as cow stock, by cow-keepers, for milk in the metropolis, and some other places, where they are found to answer in the most perfect manner, as giving very large quantities of milk for a considerable length of time.

DUTCH LYREY SORT.

The thick, large, clumsy, fleshy-thighed Dutch variety of this breed, is a sort not adapted for fatting, mostly of a red colour, with white faces, and horns much like those of the Herefordshire variety of the Devonshire breed. They appear a hardy, healthy, and well fleshed kind, with small tails, but which are never capable of being made fat, and are, of course, improper as neat cattle stock in any point of view.

Within the last thirty years, the short-horned cattle have undergone such vast improvement, that they are now become a desirable and important sort of stock in many places, where they could not before be employed.

In the plate which is subjoined, are given portrait-figures of a bull and cow of the improved true short-horned, or Yorkshire breed, shewing the particular points, parts, or marks, by which they are distinguished.

THE WELCH BREED AND SORTS

This is a species of cattle stock of much less importance than many others. The breed of Cardiganshire is chiefly black, with thick horns turned upwards; of a small size, clean-boned, of a good shape, especially where the native breed has not been injured by injudicious crossing with others in England. They are hardy and active, and in great request in the southern counties of England, on account of their being quick feeders. The quantity of milk which these cows afford is trifling; but they are, upon the whole, a breed well adapted to their own country, although still capable of very great improvement: and this improvement might be effected with more certainty, and to a greater extent, by selecting the best individuals of the native breed, instead of bringing others, possessing probably very different qualities from England.

It is supposed, that there may have been originally, two distinct breeds in this district of the kingdom, namely, the mountain kind, having large wide horns, thick hides, and much bone, in proportion to their size; the cows affording but little milk; and the low-land or southern sort, which are of a larger size, and finer form, having middle horns, and being in some instances good milkers. In Glamorganshire they are in high estimation for the purpose of draught on the lighter sorts of hilly lands; and bearing some general resemblance, to the cattle of Normandy. The cattle of this district, "are generally deep and flat in form; some of them cloddy and of great substance also. The Glamorgan, Pembroke, and Montgomeryshire, it is to be presumed, are the

most valuable varieties of Wales. The chief defect in the Welsh cattle, is want of substance, with too great length of leg; which may be remedied, probably, by a Hereford cross, when the object is beef or labour: but it seems much English crossing has been used at different periods, without effecting any very material change, the peculiar character of the country being sufficiently apparent in all Welsh stock."

The Glamorganshire cattle are rather small, of light bone, in colour black or brown, are handsome, and shew much blood. They milk well, feed quickly, and are used as beasts of labour: they need no improvement from other crosses, though there are inferior varieties of them, occasioned by mixing with the stock of the borders. This breed, it is supposed, prevails in Monmouthshire, and is to be found in the fairs and markets of Pontypool.

The Pembrokeshire cattle, are often coal black, sometimes dark brown, finched, or white towards the tail; some have white faces. They were originally finer than at present, probably the same race as the Glamorgans, which some of the Pembroke cows resemble at this time; but the breed has been crossed with the *old Leicester* with the view of obtaining milk, in which the improvers did not succeed so well, but rendered their stock coarse, bony, and unfit for labour. If butter was the object, they had better, probably, have retained the imported long-horns unmixed. This cross accounts, it is believed, for the Pembrokes being finched, and having long and round carcases. They generally labour on the roads, yoked with horses, and their journeys are performed with a speed unknown elsewhere. The Pembroke ox is too leggy, but he becomes early ripe, and will make fat at four years old. He attains the weight of 80 to 130, or 140 stone, London weight, and is reckoned to stand his drift or journey better than any from Wales, whence he finds a preference, particularly in the counties adjoining the metropolis. Two years old Pembroke bulls are generally bought up at the fairs at considerable prices, by the improvers of the neighbouring counties.

The Carmarthenshire original cattle-stock may be described, as black, coarse, ill-formed, short and thick, having wide horns of great substance at the base. The cattle, is small in the mountain districts, and of larger size in the vales, in good keep; but of no reputation as milkers. The improvers have tried various crosses—Herefordshire, Shropshire, Leicester, Pembroke, and Glamorgan, but without the desired success. The produce of a Pembroke heifer and Herefordshire bull is the favourite stock in this county, where, in truth, the prior object ought to be an improvement of keep.

The native sort of Brecknockshire is stated to be much the same as those of Carmarthen and Pembroke; but being crossed with Herefordshire, and some with Devonshire bulls, labour seems to be the object; and with such crosses and attention to good keep, a very excellent breed may, it is imagined, be raised.

The Cardiganshire kind are a smaller variety of the Pembroke and Carmarthen sorts, but hardy and less milky than most breeds.

The Radnorshire sorts are observed to be dark red, and brindled, in consequence of the original black stock being crossed with the bulls of Herefordshire and Shropshire, which are adjoining counties. Although these crosses produce stock too large for the hills, they make excellent cattle in good keep, and are of considerable size, as from 100 to 120 stone, London weight. But it is remarked, that the produce of this Herefordshire cross has not the characteristic bald face.

The Montgomeryshire cattle are, in their fa-

vourite colour, " blood red, with a smoky face." The oxen from this county fetch high prices at Smithfield.

The Merionethshire are, in the " native sort, a small and ill-shaped breed, considered to be the worst in Wales." It is asserted, however, that Mr. Corbet, by crossing both the sheep and cattle with good English stock, obtained in his improvements, much advantage.

The hardy natives of Carnarvonshire " have been formerly crossed and improved by English bulls and cows, some of the new Leicester and Warwickshire kinds. The improvement succeeded, and with a small additional expense in rearing the stock, it has been found sufficiently hardy, whether on the mountains or plains; and the improved cattle, at two or three years' old, are, reckoned to be worth more by two or three pounds each than the original breed."

The Denbighshire and Flintshire sorts have been crossed and mixed with those of England. Some of the milch cows will, three or four months after calving, give six or seven gallons of milk a day.

The Anglesey cattle may be described as a " small black breed, with wide and thick horns. This hardy race, which is prevalent there, and in far greater purity than in most parts of Wales, is preferred on account of the constant winter exposure and defect of winter provision. A celebrated English cross was tried without success. The breeders decline keeping any cattle beyond the age of three years, not finding themselves reimbursed the charge of another year. The weight, when fat, at three or four years old, is from 60 to 120 stone, the fore quarters being the heaviest. No cross, it is supposed, could possibly improve these islanders, unless bulls could be found of superior form and equally hardy."

Notwithstanding the encouragement held out by unprecedented prices, it may be said, that in the quality of the Welch cattle, generally, there is no appearance of improvement of late years. The chief cause of this defect is supposed to be the want of winter keep and a good winter system.

It is probable, according to some, that the Shropshire wide-horns originated in a mixture of the old long-horns, the Welsh, and the red breed of the west, though, of the origin of this variety, no accounts are extant, nor is it known how long they have been a permanent or established breed. They are described as " large, square, deep, and bony, with thick hides; in colour, brindled, red, and brown; the horns branching, points turned upward and backward." They are used for labour, and said to be better milkers than their neighbours of Herefordshire, with which there is no doubt they are often blended and intermixed.

Such are the different sorts of Welsh cattle, which being divided into two distinct kinds, the large and the small, possess their respective properties and uses.

In the large sort there is something of the long-horned cast, but without any thing of the shape; they are of a brown colour, with white in some places; they stand high, and are moderately straight, with white turned-up horns, being thin in the thigh, light fleshed, and well formed for labour, with good hoofs, and a nimble light walk, but with little disposition to fatten.

In the small sort, which is of a black colour with scarcely any white, the horns are neither long or short, but slightly turned up, the form mostly good, round and deep in the body, with short legs, thinnish hide, with little length of hair, and a lively quick eye, being sometimes found an useful sort of cattle stock. The cows are often good milkers in both sorts. The small

kind much disposed to fatten, and form fine marbly beef. This is a good sort for some high land keep.

The weight in the better sort of the large kind from 900 to 1,000 pounds.

In the smaller kind from 650 to 700 pounds.

Notwithstanding what has been said above, no very material improvements among this sort of cattle have yet probably taken place, as many of them are but indifferently formed, and very bad *handlers*, as stock, for the breeder or grazier.

THE POLLED, GALLOWAY, OR SOUTH-WEST SCOTCH LOWLAND BREED.

This is considered to be a very valuable breed, and in weight and size, is as much less than the long-horns as these are than the short-horns: generally weighing from 40 to 60 stone, though some particular ones reach 70 and upwards. Their most essential difference from every other breed of cattle is, their having no horns; some few, indeed, in every other respect polls, have two little knobs, or unmeaning horns, from two to four inches long, hanging down loose from the same parts that other cattle's horns grow, and are joined to the head by a little loose skin and flesh. In most other respects, these cattle resemble the long-horns, both in colour and shape, only they are shorter in their form, which probably makes them weigh less. Their hides seem to be in a medium state between the two last-mentioned breeds, not so thick as the long-horns, nor so thin as the short-horns; but, like the best feeding kind of long-horns, they lay their fat upon the most valuable parts, and their beef is well marbled or mixed with fat.

A few of this breed have been found straggling through different parts of England. Mr. Culley relates, that "the Earl of Darlington had a very handsome variety of them, finely globed with red and white; but he says, we must look for the original of these in Galloway, a large district in the south-west of Scotland, where they are mostly bred upon the moors or hilly country, and grazed upon the lands near the sea, until rising four or five years old, when the graziers and drovers take them up in great numbers to the fairs in Norfolk and Suffolk, previous to the turnip-feeding season, from whence the greatest part are again removed in the winter and spring, when fat, to supply the amazing consumption of the capital, where they are readily sold at high prices; few or no cattle selling so high in Smithfield-market, from their being such nice cutters-up, owing to their laying the fat upon the most valuable parts, a great excellence in all feeding cattle stock."

"It is no uncommon thing in this refined market," he observes, "to see one of these little bullocks outsell a coarse Lincolnshire ox, though the latter be heavier by several stones: and it is known, from good authority, that the polled cows are very good milkers, in proportion to their size, and the milk of a rich quality, yielding much more butter from a given quantity of milk than the short-horns; and also that the oxen and spayed heifers answer well for draught, which certainly adds to the value of this excellent breed. But though the generality of the cattle of the above district are polled, yet they have several with horns, which are considered a bastard or mongrel breed, by crossing with long-horned bulls from Westmoreland and Cumberland. They prefer the polled ones, and of these the black or dark brindled ones to any other; and all allow them to be the original breed of the country. The breeders of Galloway complain of their old breed being lost, or, at least, much worn out, probably by want of proper attention in the breeder."

The moors of Monigaff and Glenloue have been mentioned as the only places where this kind of cattle at present exists, which are described as generally thinner in the hind quarters, than those which have been crossed with other breeds.

Although this breed is the most celebrated and favoured in Scotland, where every breeder will boast his *true* Galloways, yet these have been perpetually crossed, as it should seem, to render them still more true. The original colour black—a few brindled—all perfectly hornless. Amongst the common run of Galloway cattle, we sometimes find them white faced and pied, with small grizzly horns, undoubtedly from a mixture with Dutch or English short-horned bulls, but this cross is said to detract twenty per cent, from the worth of a beast.

In form, "they are broad and square in the shoulders, long and round bodied, yet deep, straight, and broad on the back, with a thick shaggy coat, the legs of middling length, with large feet. The pelvis, or hinder part beneath the tail, and between the two bones, is frequently too narrow in Galloway cows, whence they want assistance, and sometimes fail, in calving. Their character is good for milkers, chiefly for quality. The oxen and spayed heifers make middle-sized beef, of an excellent quality, and the breed is with justice esteemed one of the best in Britain. The Galloway cattle are sold at two years and a half old, and probably the English graziers take off annually near 30,000 head of these cattle."

This is an useful and valuable sort of smaller-sized, neat, hardy cattle, often of a highly mellow feel, and mild aspect, having some marks of the best long-horned sort about it, but not quite so long in the body, though of better proportion there than many others, and mostly good for their size in every respect, being an excellent sort for the retail butcher. The cows are considered as good for the quantity of milk they afford, as well as the amount of butter yielded by a certain proportion of it. They have the excellent quality of supporting themselves well on most rough coarse sorts of lands of the pasture kind, as well as in woody situations, where they can get at the fresh leaves. In consequence of their small size, they do not injure pastures by treading, and may therefore be profitably put into such grounds at a more early period than the usual one, in small numbers, as preparing for the general stock, being thereby brought on more forward in their fattening, without in any way hurting the later crop.

This useful sort of neat cattle might, in all probability, be much improved in their native district, by having better accommodation and protection during the severity of the winter season, and a more abundant supply of different sorts of food for their keep.

THE SUFFOLK DUN BREED, OR VARIETY OF THE ABOVE SORT.

This is a small, very desirable sort of milking cattle, that may be found of much value, as being well adapted to situations where the larger kinds of such stock cannot be employed.

It being the prevailing kind of neat cattle in the county of Suffolk, it therefore bears the county's name, which may lead some to think it a distinct sort; but Mr. Culley is inclined to believe it no more than a variety of the Galloway breed, which might easily, he observes, take place, from the great connexion that has long subsisted between the Scotch Galloway drovers of cattle, and the Suffolk and Norfolk feeders or graziers of them. Both kinds are in general polled; and though the Suffolks are almost all

light duns, while the others are of various colours, yet this circumstance might at first proceed from a partiality to that colour. But from whatever cause this sort of cattle took its name, they are, it is asserted, at present, a very useful kind of little cattle, particularly for the dairy; and great numbers of them are employed in that line, in some parts of Suffolk, where, perhaps, the best butter and the worst cheese in the kingdom are made. The cows give great quantities of milk. According to the account of some persons, they give in common twenty-four quarts a day, which is nearly equal to the best short-horned cows. The cows of this kind, like all other deep milkers, are very lean, plain in their forms, and big-bellied. The weight of this breed averages about 50 stone.

The Suffolk duns have a lighter colour, and are smaller and finer in the bone than the Galloway sort; they are long with a large carcase, clean throat, the neck tapering to the head, the tail thin, and the legs rather short. They are excellent for the purposes of milking, whether for the dairy or private use; though the milk be probably less rich than that of either the Alderney or long-horned sorts. They are good feeders, and the beef is fine. The author of a general work on cattle thinks "it is one of those breeds of such intrinsic excellence, as not to be improvable by any known cross."

This breed of neat cattle, in some cases, has a good length of carcase, and mostly a deep rib, but the head is sometimes coarse, with too great a quantity of loose skin or dewlap below; occasionally the cows run much to belly, good udder and teats, with full milk veins; and, for their size, they probably afford more milk than any other sort. They do well on many poor kinds of pasture land, in exposed situations, on account of their size and hardiness; and they, of course, merit the attention of small farmers in such situations, much more than has commonly been the case, as affording them the most profit. But the goodness of the products from the milk, as well as the profit, must necessarily in all cases depend greatly on the management in making them. The beef is said to be good, the parts cutting up well by the butcher. This breed of cows is occasionally met with in the stalls of the large cow-keepers for milk, which shews their utility and value as good milkers.

It is a sort that might be greatly improved for feeding as well as milking, by having the small well-formed bulls of the short-horn kind put to the best-formed large milkers of this sort, and by pursuing the same method with their produce an excellent stock for such purposes would doubtless in time be produced.

THE HIGHLAND KILOE, OR SCOTCH BREED AND SORTS.

This is an excellent sort of well-fleshed, quick feeding, small kind of cattle stock. It is remarked, that this breed of cattle are still less in proportion to the polled cattle, than they are to the long-horns: this breed are also covered with a long close coat of hair like the polls and long-horns; and like these, their beef is fine-grained, well-flavoured, and mixed or marbled, but not so handsome on the outside of the beef when killed, being not of so bright a colour, and often spotted with black even upon the best parts, except when made very fat. When grazed, they feed very readily, their weight in general being from 20 to 35 stone and upwards. The most prevalent colour is black; some are brindled or dun; but the breeders here, like those in Galloway, prefer the black ones.

These hardy animals are in possession of all that extensive and mountainous country called the Highlands of Scotland, together with the western isles bounded on all sides by the sea

and the Grampian Hills; the latter of which begin on the north side of the Frith of Clyde, and run eastward into the sea near Aberdeen. This sort of cattle are frequently termed *Kyloes* in these parts of the country, probably from a district in Ayrshire called Kyle where they prevail much. But all the lowlands of Scotland, except Galloway, have a mixed breed of cattle; towards Cumberland they are *half long-horns, half polls;* on the borders of Northumberland they are mixed with *short-horns* until you reach Tiviotdale, where they become altogether a *short-horned*, or what the Yorkshire jobbers call *runts*, except a few pretty good short-horned cattle bred in that pleasant and fine country, the Tweedside. This same sort of runtish coarse breed continues all the way to the Frith of Forth. Crossing this narrow sea into Fifeshire you would at first imagine the Fife cattle a distinct breed from their upright white horns, being exceedingly light lyered and thin thighed; but it is pretty clear that it is only from their being more nearly allied to the Kyloe or Scotch breed, and consequently having less of the coarse kind of short-horns in them. The cattle all along this coast continue to change more and more, becoming still less, until upon the edges of the mountains they become quite of the Kyloe kind, but still much inferior to that pure unmixed valuable breed of Kyloes which we meet with on the more northern and western Highlands and all the isles; but particularly the Isle of Skye and that tract of country called Kintail. It is in these two districts that you meet with the native breed of Kyloes, a hardy, industrious, and excellent breed of cattle calculated in every respect to thrive in a cold, exposed, mountainous country, and better adapted to the cold regions where they are bred than any other kind we are acquainted with. These cattle are driven to the southwards in great numbers every autumn; many into the western districts of Yorkshire; but the greatest number are sent into Norfolk, Suffolk, Essex, and other parts of the South of England, where they are fattened, and either slaughtered at their home markets, or sent to Smithfield.

A late writer on cattle, thinks it not improbable, that there were only two original sorts of neat cattle in Scotland; those common to the islands and the mountain country, called Kyloes, in colour black, brindled, dun, brown, red, (black being the favourite): in form, flat and deep, like the short and middle-horned stock; very small and hardy, with small, upright, short, or middle length horns; and the polled breed chiefly confined, in later times, to the shire of Galloway, and known by that name. The former, the smallest and most hardy breed known in this island, and apparently the same with that of the more northern countries, may be seen, at this day, in its original purity, no motive existing for crossing a breed so perfectly adapted to severity of climate and scarcity of keep. The original polled cattle were of the same colours, but more varied, and considerably larger in size; in shape, somewhat long, and resembling the long-horned sort, with hides of considerable thickness: when these cattle are entirely hornless, they may be presumed to be of the genuine breed. In the Lowlands, where the soil is more abundant in provision, and when, in consequence, larger-sized cattle are supposed most advantageous, much crossing, under the name of improvement, has taken place. Thus, the Scotch polled cattle have been perpetually crossed with English bulls, both short and long horned, with Norman, and with their own mountain stock. Whence the varieties of Galloway, Ayrshire, Fifeshire, and of the runts.

The great demand for this breed in the

southern parts of the island has rendered its improvement more attended to than formerly, and attempts have been made by different spirited breeders, by crossing Isle of Skye cows with bulls of the long-horned kind.

Notwithstanding it is allowed, that the meat of the Kyloe sort is superior to that of all others, it being said to be "worth more in beef by a penny the pound than any other breed upon the island; yet some believe there is a deficiency in respect to quantity on the acre, so that if it be the best, it is the most expensive."

The weight of a Kyloe has been stated as very considerable.

	Stone.	lbs.
Two fore quarters	43	12
—— hind ditto	37	8½
	81	6½
Tallow	13	0
Hide	6	4
Total	100	10½

Or upwards of 176 stone, London weight.

These small cattle have thickish hides, with much hair, which admirably fits them for high exposed situations, and renders them proper for many purposes of the farmer on the worse sorts of land.

In their natural unimproved state the Highland cattle are frequently well-formed. Their fine eyes, acute face, and lively countenance, give them an air of briskness, or rather fierceness, heightened by white-tapering, black-tipped, and sharp horns, pointing upwards, forwards or backwards, which are often really dangerous. They sometimes rise to a considerable weight, especially when crossed with larger breeds. Their most common weight in Smithfield is from 35 to 45 stone, but they may be made much heavier. They are bred in Lochabar, Lunart, Morvin, Argyleshire, and Cowall or Rannock, in the central Highlands. They are hardy and very little subject to any kind of disease. The largest perhaps of the genuine Highland sort is the Argyle variety, which is considered highly valuable by some, and is much in demand by the grazing farmers in the more northern districts of this part of the country.

The bulls, of the Isle of Skye variety or sort, are held in high estimation by the breeders and improvers of this kind of cattle, the principal distinguishing marks of which, are fine eyes and horns, with a thick pile, and not thick-hided. They fetch from twenty to thirty guineas. This breed excels in the quality of the milk, but, with regard to the quantity, it stands in need of being crossed with the Norman, or some other kind, that is known to afford a large quantity of milk. This property is likewise said to be increased by crossing with the Fife variety or sort.

The Isle of Skye, or western Kiloe, variety of cattle, has been greatly praised by some on account of their good shape, and it is to be regretted that it was not made the basis of the improvements of neat cattle stock in the midland districts. These cattle are a small sort, but capable of being raised by careful management and good keep to a weight hardly to be supposed. Larger cattle on good land, are probably, however, more beneficial, as not having more offal in proportion than such small sorts, as has been already suggested in considering the advantage of size in cattle.

The Inverness, Ross, Sutherland, Caithness, and other small-sized varieties, though much admired for their fine-marbled and delicate flavoured beef, are not unfrequently so much injured and inconvenienced by the great length of travelling, when they reach the more southern parts of the country, as to require some time

before they begin to feed well. When, however, this has taken place, there are few sorts that answer better for the length of time and the value of the keep on which they can be fattened, or afford finer meat, provided they have nearly completed their growth, as no sort of cattle feed to perfection while they are much in the growing state, the process of taking on flesh and fat being quite incompatible with it.

The Shetland cattle are a very small sort, the cows having short legs, long carcases, with brown, brindled, and sometimes mottled faces, and moderately good hides. They have mostly that particular kind of form and shape in their different parts that suit them well for the use of the grazier and feeder; but they are very deficient in point of size, so as to be often a very disadvantageous stock for want of weight. The cows give a medium quantity of good milk.

There are varieties of Scotch cattle in the counties of Aberdeen and Forfar, which are of a tolerably large size, and very useful for the grazier in richer pasture districts, being often well disposed for feeding on such lands.

The Orkney islands contain a small breed or variety that are good milkers and afford beef of an excellent quality; but they are badly formed. The cattle of Bamf are among the largest and best of the northern parts.

The Fifeshire variety or sort is held in high estimation by the graziers in the southern parts of the kingdom; they are of a considerable size, being of a black colour, lively, and uphorned. They feed with expedition, and are fit for labour; but as milkers they are more valuable for the richness and continuance of it than for its abundance; their produce in butter is about seven pounds per week. It is probable, that they might be improved by crossing with those smaller breeds that produce milk in larger quantities. Some suppose the Fifeshire variety of Scotch cattle to be some of the best raised in that country.

The Renfrew, Ayrshire, or what are usually called the Dunlop variety or sort, are, for their size, considered the most valuable for the purpose of milking in the island, excelling equally in quality and quantity. They produce from three and a half to seven gallons a day, and have the character of being the best possible poor man's cows on account of being able to shift on very scanty keep. In appearance they are small and ill-looking, with the shape and pile of Highlanders, yet bearing more resemblance to the *Dutch* than to any native Scotch breed. Their horns are short and small, standing remarkably irregular and awkward; the colour generally pied, or of a sandy red. They appear thin, like the Alderney, even in the best pasture; and the few which are bred up to oxen make but a poor figure in grazing, scarcely reaching the common weight of Kyloes. It is supposed that this milky race is the result of crossing the cows of the country with Alderney bulls; the cows perhaps having previously a portion of Dutch blood in them.

The Berwickshire variety of neat cattle have been improved by Teeswater bulls from Northumberland. They will make, at three years old, from 60 to nearly four score stones of 14 pounds, and, at five and six, from 80 to 120 stones. The best cows will milk as high as six gallons a day. The ox is described as having a "long face, open countenance, clean and small, turned up curving and spreading horns, straight shanks, straight and round along the back, full and deep in the ribs, short legs, thighs turned out, open-boned." The improved sort of this breed is highly valuable.

Several of the above valuable varieties of Highland Scotch droving neat cattle are now,

from the greatly increased demand for them in the more southern parts of the kingdom, scarcely to be procured, especially the bullocks, except while in their young growing state, as from about two to three years of age, they often require to be kept a little to finish their growth, and improve in condition for being fed out to most profit.

THE ALDERNEY, OR FRENCH BREED.

It has been observed, that this breed of cattle is mostly to be met with about the seats of our nobility and gentry, on account of their giving exceedingly rich milk. It is a breed which is thought too delicate and tender ever to be much attended to by farmers in general, because the animals are not able to bear the cold of this island, particularly the northernmost parts of it. They are very fine-boned, in general, light red or yellow in colour, and their beef generally yellow, or very high-coloured, though very fine in the grain, and well-flavoured. They make themselves very fat, and none are in the least subject to lyre or have black flesh. Mr. Culley has seen some very useful cattle bred from a cross between an Alderney cow and a short-horned bull. The late Mr. Hunter produced a very beautiful little cow from the Alderney by a buffalo, which is said in the Middlesex Agricultural Report, to have kept plump and fat, both in summer and winter, on much less food than would be requisite to support a beast of the same size of the ordinary breed.

By an experiment which is stated in the Agricultural Report for the County of Kent, made between a large homebred cow, of eight years old, and a small Alderney, of two years old, it appears that the homebred cow in seven days gave thirty-five gallons of milk, which made ten pounds and three ounces of butter; and the Alderney cow in the same length of time gave only fourteen gallons of milk, but which made six pounds and eight ounces of butter.

An useful writer on these subjects remarks, that the cattle of the islands on the French coast are collectively known by the name of Alderney. "These are," he observes, "a variety of, and smaller than the Norman, light red, yellow, dun, and fawn coloured; short wild horned, deer necked, with a general resemblance to that animal; thin, hard and small boned; irregularly, often very awkwardly, shaped." This description, however, is considered to refer chiefly to the cows; which are thought amongst the best milkers as to quality, and that in weight of butter, for size, they are far superior to all.

"The Norman and island cattle make fat very quickly, and for their bulk, arrive at considerable weight. The beef is of the first class, very fine-grained, in colour yellow, or of that high colour, with a bluish cast and elastic feel, which denotes the closest grained, most savoury, and finest meat."

It is further remarked, that "they are too delicate to be much attended to by the farmers of this country; but that many persons near the metropolis and along the south and western coast make a trade of importing this sort of cattle, which is peculiarly adapted for private families."

These cattle have, however, sometimes white and mottled faces, with spots of the same colour on other parts, and short crumply horns. Their form bad, and size small, being often in the cows very large in the belly, but the udder and teats mostly of the proper shape for milking. The milk, in some cases, very rich, but small in quantity in proportion to the keep they require, consuming much in the same degree as those large cows of other sorts, which produce double the amount, and often not at all

inferior in goodness. They must consequently, in many cases, be kept at great disadvantage as milkers as well as for fattening, as large cows would afford more than twice the weight of meat when well fattened.

They may be improved in many cases perhaps by having the great richness in the quality of their milk somewhat reduced by proper crossing with short-horned or other suitable bulls.

THE IRISH BREED OR VARIETY AND SORTS.

The Irish cattle were originally long-horned, smaller than those of this country, somewhat coarser and higher on the leg; but their produce in hide and tallow considerable. The mountain cattle are smaller and coarser than those of the low country, giving a very small quantity of milk. No country in the world, it is supposed, produces so many cattle in proportion to its extent as Ireland; it is, consequently, much to be desired, that they were of a better kind.

Though these neat cattle stock have mostly in both the large and smaller sorts some distant resemblance to the Lancashire kind in the nature of their horns, yet in some places there is a variety of such cattle to be met with which has a very considerable difference in the form of the horns and other parts, the former being shorter and not unfrequently turned a little upwards, less length of leg, with the body more short, having a certain roundness and thickness, the whole of the higher parts of them in general pretty wide and heavy, the hide good, with more disposition to fatten than the other sorts of that country. They are probably a mixed sort of cattle, partaking of our north country or south country mountain kinds with those of the long-horned sort; the females of the former of these sorts, and the males of the latter, as they are often of considerable size. In the more northern parts of that country, too, a small-sized sort that has greatly the appearance of the large kind is met with, which arises probably from the inferiority of the keep in such parts. They are so coarse in most of their points as to merit but little attention by the grazier or feeder. They are considered a very bad sort, with little or no disposition to become fat, which is very contrary to what might have been supposed; as having been raised on such very inferior land, it might be presumed that they would rapidly take on flesh and fat on being put into rich pastures. The tendency to fatten readily, however, seems neither to depend on size, the nature of the early rearing, keep, or any particulars of that kind, but most probably in some degree on the shape, and especially on the nature of the breed. The weights of the Irish breeds or varieties of cattle are very various, in some being very great, in others but little.

This part of the United Kingdom would be benefited in a very high degree by having better fleshed, and more fattening, as well as milking kinds of neat cattle stock in it.

SECTION IV.—*Considerations and Conclusions on the Breeds and Varieties proper for different Situations and Circumstances.*

THE descriptions and accounts of the different breeds, varieties, and sorts of Neat Cattle, as detailed in the preceding sections, clearly demonstrate, that all those cattle cannot be equally suitable for the various purposes of the breeder, the rearer, the grazier, the dairy-man, the butcher, and the consumer. Some have a better disposition to fatten than

others; some are of a larger size and weight; some, again, are more hardy, and consequently less liable to disease, whilst others give a larger quantity of milk, and some being cleaner-boned and better-formed, are encumbered with less offal or waste parts. In short, it is evident, that each separate breed or variety is distinguished by some one or more of the particular properties or qualities which render cattle valuable; and whether these different qualities can be united in the same animal, or whether a breed of cattle possessing all the requisite properties, would be equally suitable to all situations and circumstances, are questions not easily resolved. As to the first inquiry, though it seems almost universally agreed, that there are two desirable qualities in cattle which cannot be united; namely, a disposition to fatten, and a tendency to yield a large quantity of milk; yet that much may be effected towards a combination of these properties, by perseverance and proper attention, has been already shewn. The form of the animals most remarkable for the former quality, is very different from the shape of those which are celebrated for the latter. The good feeder, instead of being flat in the sides, and large in the belly, as all great milkers are, is higher sided, and lighter bellied, and, in short, its body is more round and less deeply formed, while that of the milker is more wide, deep, flat, and larger below.

It is not probable, therefore, that the properties of two breeds or sorts of cattle, so opposite in form and general appearance, can ever be wholly united in the same animal, though there may be an approximation towards it by careful breeding. If a large quantity of milk, whatever may be its quality, is the object, the dairy-man must content himself with such plain ill-looking animals as have been already described. And as the milk of all cows is not of the same quality, it appears highly probable, that in proportion as the cows of the milking-tribe exceed those that are more disposed to fatten in quantity, in nearly the same proportion will their milk be inferior in quality; a great deal must, however, constantly depend on the mode of feeding. If the above be the case, the superiority of the quick feeders seems to be completely established; as, while cattle of this description are confessedly better for the purposes of the graziers, the butchers, and the consumers, they would, if this point were determined in their favour, be also more valuable for the dairy-man. No person will assert, that to procure a gallon or two of whey or butter-milk extra (for the question, it is supposed, comes to that,) he would prefer a breed of plain-looking, ill-formed cattle, to one which, except in that particular, is more valuable in every respect. No person who has a knowledge of the different breeds of cattle will contend, that cattle which are disposed to fatten quickly, and at an early age—that, from the superior excellency of their form, have a small proportion of offal, or what the breeders term, *not-essentials*—and that, although they yield not a large quantity of milk, yet make up for that deficiency in the richness of its quality—are not more valuable than those which have nothing to recommend them but the single property of being great milkers. If, however, both properties can be united, as is said to be the case in some instances of the improved short-horned sort, the superiority of such a stock will be still much greater.

The long-horns, it is said, by an able writer on live-stock, excel in the hide, hair and quality of the beef; the short-horns, in the quantity of beef, tallow and milk. Each breed has long had their particular advocates; but is it not

probable, that both kinds may have their particular advantages in different situations. Why may not the thick firm hides, and long close-set hair, of the one kind, be a protection and security against those tempestuous storms, winds and heavy rains, to which the west coast of the island is so subject:- while the more regular seasons and mild climate upon the east coast are more suitable to the constitutions of the short-horns? When it is asserted, that the long-horns exceed the short-horns in the quality of the beef, it is meant, that preference is only due to the particular variety of long-horns, selected, improved, and recommended, by the midland breeders; for as to the long-horned breed in common, there is reason to think their beef rather inferior than superior to that of the generality of short-horns; and there is little doubt, but a breed of short-horned cattle might be selected equal, if not superior, to even that very kindly-fleshed sort of the Bakewell improved kind, provided any able breeder or body of breeders would pay as much attention to these as has been bestowed on the long-horns. But it has till lately been the misfortune of the short-horned breeders to pursue the largest boned ones for the best, without considering that those are the best that pay the most money for a given quantity of food. However, the ideas of the short-horned breeders being since more enlarged, and their minds more open to conviction, very great improvements have in some cases been made in that breed of cattle. Indeed, such rapid improvement had then taken place in the breeding of the short-horned cattle-stock, that Mr. Culley, when he wrote, thought that they must soon surpass their rivals the long-horns; but observed, that notwithstanding these two breeds had hitherto been chiefly in possession of the best part of the island, he was inclined to think that the Galloway cattle, and even the Scotch, or Kyloes, might be bred and had recourse to with advantage in many situations, so as to be more profitable than either the short-horns or the long-horns. That breeder has a very high opinion of both these breeds of cattle, as true quick feeders, and as being kindly-fleshed or excellent eating beef, which character they have obtained in the first market of the island, that of the metropolis.

It is also the opinion of the same writer, that the Scotch or Kyloes are better adapted to cold, exposed, heathy, mountainous situations, than any other kind, and that particular breeds or varieties are probably best adapted to particular situations; on which grounds he strongly recommends to breeders of cattle-stock, to find out which breed or variety would be the most profitable, and best suited to their situations and circumstances, and endeavour to improve that breed to the utmost, rather than try to unite the particular qualities of two or more distinct breeds or sorts by crossing, which is a precarious practice; as we too generally find the produce inherit the coarseness of both breeds, and rarely attain the good properties which the pure distinct breeds individually possess.

It is plain, therefore, from what has been said, that the long-horned sort of cattle, in their more or less improved states, from the nature of their hides, and the length and closeness of the hair that covers them, are most proper and suitable for moist, cold, exposed, districts of country; where there is an extent of rather good, strong-landed, coarse pastures, for turning them upon: as on such they mostly do well, coming on fast in their growth while young, and when that is over, feeding out, or fattening more readily and kindly in the summer months at grass in the grazing-grounds. They

stand less in need of the shelter of the fold-yard or houses than most other sorts, and go on better and with more advantage under that system, in particularly exposed situations and circumstances; though due warmth is never unfavourable to either growing or feeding neat cattle-stock.

While the short-horned, or Yorkshire, sort, on account of their thinner hides, with less hair on them, and their very great size, are better suited to countries and districts where the pastures are of the more rich, deep-soiled, protected kinds, and that constantly abound in good food. They also stand the house and the fold-yard system, for the most part, in a better and more beneficial and healthy manner than almost any other sort, whether on high or ordinary store keep. The oxen of this sort being very large, with tolerable disposition for fattening, are excellent grazing-stock on such sorts of pasture lands; and in general may be bought low, as they are not so much valued for their beef. They are capable of paying very well for their keep, and probably yield as much or more profit than any other sort at the same age. They are ready for feeding at three or four years old, and are less inconvenienced by travelling than most other kinds. They are not less useful, probably, for stall-feeding, being able to stand it better than most other kinds.

The mixed large Lincolnshire breed, or cross of this sort, is also well fitted for these sorts of land and pastures, as they mostly feed to great weight, and afford a good profit.

The middle-horned, or North Devonshire, improved sort of cattle, are found to be proper and beneficial for most of the thin and less rich pasture lands in the south-western parts of the island, on account of the size, the nature of the hide, and of their being early ready, well-fleshed, and speedy in getting fat. They answer well in those parts, both in the grazing-grounds and stalls, being well suited to the nature and circumstances of the land, especially the more improved of this kind, which often feed to a good weight, and afford beef of a very excellent quality.

The Herefordshire variety of cattle are not exceeded in size by any except the Yorkshire; they are, consequently, well suited for grazing-stock on pastures and lands of the above rich sorts where the keep is good. The medium thickness of their hides enables them to thrive better in moist climates than the true short-horns, but not equal to the long. They are greatly esteemed for this quality, and for their beef.

The Sussex variety of cattle-stock is well adapted to be the grazing sort for the weaker, and less rich, lands and pastures, which are extensive in some districts. They are a very good and complete sort, with a good disposition for thriving, and they feed to a good weight, though at a less early age than some other kinds. In their own district they are also found to answer well in stall-feeding.

Of the cows of these several breeds and varieties, with a view to large quantities of milk, the short-horned, or Yorkshire, is by far the best; affording nearly double the quantity of most of the other breeds and varieties, with no indifferent disposition to fatten in many cases, especially in the improved sort. But though the quantity of the milk in the other sorts be often small, the quality is frequently rich and good, though not always affording any very material difference in that respect, much depending on the nature and quantity of the food. There is, of course, considerable advantage in this sort of cow stock, arising from the saving of the outlay of money, as fewer answer the purpose. Besides the expense thus saved, it must be remembered that other sorts do not

fatten under such milking system, that they are longer dry or wholly useless; that they waste more food, and yield much less profit from their carcase. There is often little or no less in the short-horned sort in milking for a considerable length of time which is greatly in their favour as such cow stock. Where the nature of the land, food, shelter, and keep are favourable, not any sort of neat cattle stock are so profitable for all the above uses as these.

The proper uses and application of the oxen of the Welsh breed have been noticed already, in which they are sometimes found a very profitable sort, as being in the best of the large kind often very large in size. The cows of the small sort of this breed may occasionally be more beneficial on the inferior kinds of thin pasture lands, in the higher or more bleak situations of some districts, than the larger milking kinds.

The Galloway polled breed is found of much value as store or rearing stock on such land as is of the poor moory sort, and rather exposed, being fed out on such as is a little better, in a ready and profitable manner. The cows are not only good as milking stock for the quantity produced, but as furnishing much butter in proportion to it.

The Suffolk dun breed or variety of this sort of cattle is an excellent kind of milking stock in some dairy districts, where the pastures are of a good but not the best quality, yielding well in both milk and butter; but the cheese sometimes not so good, probably owing to something improper in the process of making it. The oxen on such land feed well as grazing stock, but are hardly of sufficient weight, rarely exceeding from five to seven hundred pounds in the butcher's scale, but the meat is good.

The Highland Kiloe Scotch breeds and varieties of neat cattle are highly desirable and useful rearing, store, and grazing or fattening stock on many pastures of the high exposed and less rich feeding kinds, as well as on some low marshy tracts; as they soon feed out on such, and become excellent small beef at the time when the large is not so much in request, and of course afford a better profit to the grazing stock-master. The great variety of these sorts of cattle in their sizes makes them excellently suitable for all the several sorts of these kinds of grass lands, and thus renders them highly profitable to the grazier. The cows, as milkers, commonly yield only small quantities, but the quality is mostly very good, and the consumption of food comparatively small; they are, therefore, suitable for cottagers and others in situations where the keep is not good, or is limited in quantity.

The large Irish breed or variety of neat cattle are but seldom well suited as profitable stock for the more rich sorts of strong pasture lands; yet in such the oxen become good beef in no great length of time. As milkers, they can rarely be found useful, the cows seldom giving more than a middle quantity, but the milk rich in relation to the quantity, and the products of it good both in butter and cheese.

It is obvious, from what has been said, that the great art and business of the breeder and grazier consist in nicely suiting the nature, quality, and size of his neat cattle stock to the nature and quality, extent or deficiency, of the keep he can command; in order that loss may not be sustained by raising and supporting or fattening smaller or larger sorts than such as are perfectly suited to the quality of the land and pasturage, as otherwise there must be a diminution of those full and complete profits and advantages which stock farmers and others ought to calculate upon receiving in return for their capital and labour.

On the whole, the long horns are probably,

in general, the most fit and useful sort of neat cattle stock for occupying the middle and more north-western parts, the short-horns for most of the north-eastern districts, and the middle-horns for the more south-western tracts of the country; but that of the three breeds, the improved short-horns, as uniting in a great degree the properties of large milking and quick feeding, may be generally beneficial in all.

The small Scotch sort are unquestionably the most suitable for the high exposed, very inferior pasture lands on which they are found, and might probably be had recourse to with much benefit, in similar situations of Wales and Ireland; while the richer valley parts every where would be more advantageously occupied by a larger kind, such as the polled Galloways or improved short-horns in their more or less perfect states.

Such a distribution would most probably improve the country, with respect to live cattle stock, to the greatest possible extent.

In all cases, the largest beasts of any sort that can be properly kept will mostly be found the best and most advantageous, as yielding the greatest profit; and generally speaking, much larger cattle may be supported and well kept of the improved and finer sort than of such as are of inferior kinds; consequently, more attention should be paid to the having good breeds and sorts in every case, as tending to give such benefit in the fullest proportion.

In the above several different breeds, varieties, or sorts, of neat cattle, there is commonly a very great difference or variation in the nature, rapidity or earliness, and extent of their growths, as well as in their increase in size and weight in different periods, lengths of time, or ages of their existence; but it is probable that the short-horned kind, in their improved state, greatly exceed most other sorts in these respects, as they usually rise to very large sizes, weights, and dimensions of their various points or parts at early ages, as will be rendered extremely evident by the account which is given below of extraordinary beasts of this description.

In different particular oxen of this sort of great growth and weight, the dimensions of their several parts have been recorded to be these:

OXEN OF GREAT WEIGHT.

DIMENSIONS.

	AGE.	LENGTH.	HEIGHTS AT			GIRTHS AT			BREADTHS AT		WEIGHT OF		
		Horns to rump.	*Crops.*	*Loins.*	*Breast.*	*Crops.*	*Belly.*	*Loins.*	*Hips.*	*Shoulder.*	*Carcase.*	*Tallow.*	*Hide.*
	Years.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	sts. lbs.	sts. lbs.	sts. lbs.
Blackwell ox	6	9 5½	6 0	5 8	2 1	10 6	——	9 7	2 10	2 10½	151 10	11 0	9 0
Howick red ox	7	9 4	6 0	5 10	1 11½	10 0	10 8	10 1	2 10	2 9	152 9	16 7	9 2
—— mottled ox	7	9 8	5 10	5 9½	1 7	9 8	10 10	9 10	2 11	2 7	152 8	16 0	9 11
Barningham ox	5	——	——	——	——	——	——	——	——	——	150 4	16 0	9 2
Charge's ox	7	8 2	6 2	——	1 8	10 7	10 8	10 10	2 9	3 0½	168 10	13 0	——*
Colling's ox	5	8 4	5 3	5 5	1 6	10 0	10 2	10 2	2 7	2 7	168 0	——	——
——	10	——	——	——	——	——	——	——	——	——	220 0	——	——

It is stated, that in the last, the Durham or large ox, which was travelled so much about as a show, there was a peculiarity of form and niceness of handling that denoted much disposition to fatten at an early age, and in a steady manner; as when five years old, he is said not only to have been thickly covered with fat on all the chief points or parts, but that the whole carcase

* There was a loss of weight in this ox, at the time of being killed, from illness, of at least eight or ten stones.

was in a manner loaded with it, so as to be then considered a very extraordinary animal, and be purchased for the above purpose, at the price of 140*l.*, being supposed to weigh 160 stones, the live weight being 216 stones of 14 pounds each; which weight was not considered as arising so much from the superior size of the beast as from these other circumstances, as is clearly shewn by the comparative statements in the above tabular view. The animal, after having been travelled for five weeks, was again sold for the sum of 250*l.*, and ten days afterwards, he could have been resold for 525*l.*; about a month after that for 1,000*l.*, and ultimately for 2,000*l.*; but he was preferred to be kept, as promising a greater reward. However, these extraordinary prices give strong proofs of the great excellence of the animal, and of his very great superiority. When travelled about, over most parts of the country, for nearly six years, his hip-bone was accidentally dislocated, and after continuing in that situation for eight weeks, he was under the necessity of being killed; and although there must have been much loss of weight in this length of time under such painful suffering, the carcase had these weights of 14 pounds to the stone:

	Sts.	*lbs.*
Four quarters . .	165	12
Tallow	11	12
Hide	10	2

This, under all the disadvantages and harassing circumstances of so many years' travelling and painful uneasiness, is stated to have been the weight of the animal at eleven years' old; but had it been kept in a quiet state, and properly fed and managed, until seven years' old, it is conceived, that there is little reason to doubt but that it would have weighed more then than it did at ten years old, at which age, the live weight is stated to have been nearly thirty-four hundred weight, or 270 stones.

	Sts.
If from which be taken for offal . . .	50
The weight of carcase left is	220

A MORE EXTRAORDINARY OX.

It has been stated, that there was lately an ox of the Teeswater short-horned breed, belonging to Mr. Gibb, on the farm of Nunfield, near Dumfries, the dimensions in the several parts of which were these:

	Ft.	*In.*
Length from nose to top of rump . . .	11	11
Girth round the middle	10	0
—— round at the heart	9	7
Height at the shoulder	6	2
Height from hind foot to top of rump .	6	6

Besides being of this very great size, the animal was extremely well-formed in most of his points or parts, and very handsome, having probably the capability of feeding to the largest size that has been seen in any part of that district, as even that of the famous Capsall ox, the largest ever seen there. He was supposed, by good judges, then to weigh nearly 280 stones English weight, and was both higher and stronger in the bone than the Capsall ox, so that it could not be known to what size and weight he might ultimately reach. He was just five years' old, and was bought in, it is said, at Carlisle market, when only one year old, for 9*l.* sterling, which, for his age and condition, was very high, but which was given in consideration of the largeness of his bone. It is said, too, that he has been disposed of for exhibition, for the handsome price of 200 guineas. He was not much attended to in his keep or management during his rearing, being one season principally wintered on wheaten straw for ten shillings, besides the manure.

It is probable, from these several accounts of the growth and increase in weight and size in beasts of the short-horned sort, where they are of the best bred and improved kind, that they, in common, far exceed and outdo all the other

breeds in the country, in such respects, though some of them may occasionally approach pretty nearly to them, as those of the best of the long and middle-horned breeds, as well as some of other mixed kinds.

When the breeder or feeder of neat cattle finds large animals of that sort to be the most suitable for his purpose, it will, of course, be the most proper to have recourse to the short-horns in their best states, as being the most expeditious and certain in coming up to what he wants, in respect to size and weight.

THE BULL, OX, AND COW.

These are animals, each of which requires much consideration and attention, in the raising of neat cattle stock; as the qualities and goodness of all such stock principally depend upon the inherent excellence of the properties, and the perfection of the form in the several different parts of the first, or bull; on the labour and the quantity and value of the meat produced in the second, or ox; and on the proper raising of stock and the supply of milk in the last, or cow. Each sort consequently demands inquiry and attention, in order to be fully and properly examined with reference to the particular points on which its utility and advantage principally depends.

SECTION V.—*The Bull, or Male Animal.*

ON the principles which have been laid down for the breeding of animals, as they relate to the inheriting peculiar qualities, it will be evident, that in providing bull stock, particular attention should not only be paid to their having those good properties that are natural and belonging to them as males, but that they be well descended from an ancestry that have possessed the valuable qualities which are particularly desirable and wanted; as this point is much more essential in the bull than the cow, as the effect will extend to the whole progeny descended from him.

In respect to the most appropriate form, and the proportions of the different most essential parts, the rules which have been already given for raising and improving animals in general, will apply to the bull. But the usual shape of such parts for well-formed bulls has been considered and described by an experienced breeder as follows: the head rather long, and the muzzle fine; the eyes lively and prominent, the ears long and thin, the horns white, the neck rising with a gentle curve from the shoulders, and small and fine where it joins the head; the shoulders moderately broad at the top, joining full to the chine or crops, and chest backwards and to the neck vein forwards; the bosom open, breast broad, and projecting well before the legs; the arms or forethighs muscular and tapering to the knee; the legs straight, clean, and very fine boned; the chine and chest so full as to leave no hollows behind the shoulders; the plates strong to keep the belly from sinking below the level of the breast; the back or loin broad, straight, and flat; the ribs rising one above another in such a manner that the last rib shall be rather the highest, leaving only a small space to the hips or hooks, the whole forming a round or somewhat barrel-like carcase; the hips should be wide placed, round or globular, and a little higher than the back, the quarters from the hip to the rump long, and instead of being square, as recommended by some, they should taper gradually from the hips backward, and the turls or pott-bones not in the least protuberant; rump close to the tail, the tail broad, well haired, and set on so high as to be in the same horizontal line with the back.

The proper form or shape of the different

points or parts of the bull as since given, especially in the view of getting grazing and fattening stock, are, that besides a smallness, thinness, and fineness, of the mouth, lips, and ears, there should be a smallness and bending down of the horns in a neatly curved manner, with a yellowishness in their colour, and fixed low on the crown; that in the whole head there should be nothing of coarseness, but rather a fineness, as shewing an aptitude to take on flesh and fat; that the neck near its junction with the head, above as well as below should be fine, but regularly swelling out all the way, until its union with the breast and shoulders, which should be neat and lofty, its length proportionate to the other parts, with little loose hanging skin any where: that the part called the neck-vein should be very full; and that the upper portion or withers, should be broad, strong, and well fleshed, where it connects with the chine or back-bone, as shewing much good meatiness: that the breast should be broad and pointing well forward, shoulder tops also broad and rather higher than the loins and rump, but having a slight regular rise, as displaying more fulness of good flesh; outer parts of the same fine, so as not to shew any bony protuberance or coarseness of any kind: that from the highest point of the head to the tail, the line should be nearly straight, except the slight rising on the upper side of the chine, and the back broad in order to afford the most weight of flesh on all the fine parts; that the ribs should be moderately rounding out from the chine, neither too highly nor too flatly, as too full ribbed beasts are found to be light and deficient in weight of meat on the best parts, in consequence of the large hollows on the insides where the ribs articulate with chine or spine; that the upright bony processes of these parts, to which the ribs are articulated, should have considerable length, and the latter not form so short a curve in their lower parts as is often noticeable; nor ought they to be broader below than at the top, but constitute a suitable depth on the sides; and that the last rib should be so near to the huck, as not to shew any hollow, when the belly is even empty; that the huck-bone should have a round form at its end, rising something higher than the ribs at the rump, which last ought to be long, and level with the back and ribs, supplying width about the tail; that the bones placed on each side the tail, should be a little lower than that part, and not too far apart: that the most elevated part of the tail should be a little higher than the chine or spinal part of the back-bone at the rump, and the upper end of it that joins the rump considerably thick, but to have a tapering form downwards, so as to become very small at the bottom, such thickness upwards mostly shewing much depth of flesh on the rump, and a full chine in the whole of the back, within as well as without: that the thigh ought to be well covered with flesh in such a manner as to form a good round full part, regularly narrowing and lessening towards the shank part, but not with a too full fleshiness on the outside: that the legs should be straight; and the twist or part between the thighs well cloven, and low down towards the shank; that the flank should be large and full, uniting with the cod, and approaching the rump, in such a way, as when in the fat state to swell out between the thighs below the tail, which denotes inside fat: that the tail should be formed as above, but rather short in relation to the other parts, and not too much covered with hair: that the hide should not be either too thick or too thin, but be elastic and mellow to the feel; as either extreme, but especially the latter, often denotes a disinclination to fatten: that the walk

should be easy, light, and nimble, in which the hind feet ought to approach nearer to each other than the fore, so that little light may be seen between the thighs: that the hair should be rather long and soft, and of the colour particular to the breed or variety, as short close harsh hair certainly denotes indisposition to fatten well: that the side appearance of the carcase should be long, with little shoulder, but with great length from behind the shoulders to the tail, and much let down in the shanks: that the standing of the animal should be high, but that height should chiefly consist in the body or carcase; and though the legs should be relatively long to the other parts, they ought to appear somewhat short: and that the body should be of good depth but well rounded, so as not to discover hollows or weak places any where. The bones of bulls should not be either too small or too large, as all large male domestic animals are found to be less valuable, as they lose the bold masculine appearance which is characteristic of them.

In all bull stock it is very material that there be as just and correct a proportion as possible in the several parts and in the connected whole, as giving the greatest perfection and the largest quantity of meat in the produce which they afford; for where there is a want of either proper length or depth in the carcase, there will be a deficiency of muscular flesh; and a diminished weight is to be apprehended, as animals that are too short or too round, though hardy and not unfrequently quick in feeding, weigh light, and have too much fat, without that fleshy thickness and substance in the principal parts that is always the case in the well proportioned carcase, whatever its size or nature may be. On this account too much roundness in the body without depth is to be prevented as disadvantageous, as very much depends on the exact and proper form of the male in raising this as well as every other sort of live stock.

In the raising and bringing up of young bull stock, the animals should constantly have regular, full, and abundant keep of the best kind, from the time of their being produced until that of their full growth. It is in some cases thought beneficial to let them have more milk while young than that which is given by their mothers, as very excellent bull stock has been produced by such means; but equally good stock of this kind is capable of being raised by the pail, as that of sucking or taking the milk from the cows, and which is probably a much more economical method, as other cheaper and as nourishing kinds of food may be made use of in the practice, such as thin oatmeal gruel, made with the liquor of boiled meat of any kind, linseed meal gruel prepared in the same manner, or with other nutritious liquid substances, such as hay tea, or infusions of other sorts, and many other kinds of liquid food of a similar nature and quality.

All bull stock while young should be so kept and managed as to be rendered quite tame and gentle, which is easy to be accomplished at that time by proper care and attention, as many have been rendered so mild and quiet as to permit almost any thing to be done with them.

Young bulls should never be suffered to ride at too early an age, as when that is the case, they seldom get to their full or perfect growth. The proper period will depend much on the nature of the breed, but from one to two, or two years and a half old, will in general be the best, as they may be of a kind, more or less early in coming to the state of perfection or maturity.

The vigour of the bull will continue a great many years, in cases where it is not too freely

used at an early period, but is commonly in the most perfect state from the age of about two to that of six years old. It should constantly be well sustained, and supported by proper keep and suitable management. When the bull is cut or twitched in the aged state, he is termed a *seg*.

Bull stock in every case should be good and as well bred as possible, on account of the very great effect it has in bettering the neat cattle of the country, where it is in a perfect state, and the great mischief it does in rendering them worse when in a contrary condition. The injury effected by bad bull stock is far more extensive than is commonly supposed, and may be considered as a material cause of the slow progress of improvement in animals of the cattle kind.

The bull is chiefly kept for the purpose of propagation, though if not reduced and rendered too dull, slow, and heavy in leaping by it, he may be subjected to the yoke, but there is no certainty of his working quietly; and the use he may make of his prodigious strength should be constantly well guarded against. Bulls are, for the most part, naturally untractable, stubborn, and fierce; and frequently in the bulling season, almost absolutely furious and uncontrollable; they should therefore constantly be kept in proper enclosures for the purpose.

Section VI.—*The Ox, or Castrated Male.*

The male beast by castration, is rendered perfectly tame and quiet without any considerable diminution of strength or power. He often grows larger, more heavy, and unwieldy, but becomes more adapted to labour, as well as more tractable, by this operation. In this state he is called an ox.

Oxen, like other domestic animals, vary much in size, shape, early maturity, readiness in fattening, consumption of food, qualities of their meat, their colours, and several other particulars and properties of importance to the stock farmer, as already shown; but whatever be the nature of them or the colour, the hide or coat should be glossy, and rather thick and smooth to the touch; for if it be harsh, tough, or very thin, there is reason to suppose that the animal is out of order, or at least not of a strong or good constitution.

With a view to the supply of human food, such oxen as are the most ready, or early in arriving at a state of perfection, which take on flesh and get fat in the speediest manner, and with the least consumption of keep in proportion to size, and which ultimately rise to a good weight of carcase, are the most proper for the purpose. Many of the improved sorts will be found particularly advantageous in this intention, such as the best feeders of the long and short-horned kinds, and the most weighty of that of the Devon. But besides these, there are several other breeds and mixed kinds that may be equally beneficial in particular situations and circumstances, attention being always paid to the nature of the flesh and the quickness or readiness in fattening.

In raising them for this purpose, they should be from the first kept in a thriving condition without sustaining any sort of check or stunt in their growth at any season; by which treatment they will be ready in general to go off at from two and a half or three to four years old, and with the greatest advantage to the rearers and consumers.

OXEN FOR LABOUR.

Some, from making imperfect trials and experiments on the utility of oxen in the plough and other labour, have been disposed to think them well adapted for draught purposes, as no

horses are thought to draw better; and from too hasty and inconsiderate views of the matter, have declared that the ox, as a labouring animal, is far superior to the horse. That the strength of oxen depends upon their age and breed, and their activity on their make and strength. That a two years old ox is as worthless in work as a two years old horse; and that the working of either is unpardonable. That an ox does not arrive at full strength, especially if worked while young, until he be six years old; but that at that age, a large deep-chested ox is equal in strength to a strong well-made cart-horse. That on the road, or in farm carriages, oxen are beyond all doubt, equal to horses, and at plough they are not inferior, except their work be very heavy. In heavy work they will not labour like horses, but will always keep their steady pace. In this point of view, and in this only, it is supposed oxen are unequal to horses; still others have eulogized the working of oxen as one of the most important improvements in the art of cultivation, as animals of this sort are equal in tractableness to the horse, and are capable of being worked and supported at far less expense where not prevented by narrow and ill-founded prejudice. Much saving in the consumption of expensive food is thus effected, as by their steady draught as much team field work may be done in the day as by horses; and they require nothing but grass in summer, and in winter straw or hay, with a little turnip: they also make very good manure by their dung; and besides costing less at first, and being cheaper by much in their keep than horses; if by chance they become disabled from work, they may be fattened for beef, while horses in the same circumstances become wholly useless. Horse stock requires to be frequently renewed, while that of oxen may be deemed perpetual, as when they are past labour, they may be sold for more money than will buy others: horses require much attendance, while oxen stand in need of nothing but their food; the expense of shoeing oxen is a mere trifle, while that of horses is very considerable; and lastly, the benefits of working oxen extends to the whole community, as the markets are thus supplied amply with beef, by which means the price is lowered as well as the prices of leather and tallow.

On the other hand, when the form, construction, and nature of the feet of oxen; the upright shape and position of their shoulders; their modes of feeding, and of procuring their food, together with their habits and constitutions, so little adapted to labour or travelling, are fully considered, investigated, and understood, it will be seen that they are much less qualified for team work of almost every sort than the horse. The feet being longer and divided, more readily admit the loose earthy mould and other hurtful substances than in those of the horse kind, which are close, by which much more injury and inconvenience is sustained; the greater uprightness of their shoulders renders them far less fit for draught and all other sorts of team labour; their constant inclination and habits of feeding and chewing the cud while at work, by lessening their activity, render them inferior for such uses; and their habits and dispositions produce such uneasiness and distress in working, as almost wholly unfits them for the purpose. There can indeed be no sort of doubt, that if oxen in general had been better and more profitable than horses for team work, the discernment of the farmer, who is never inattentive to such matters, would long since have seen it, whereas it is only in a very few local unimproved districts of the country where oxen are used in such work.

There are other points of this question, too, which have not been more accurately decided on:

Oxen are not capable, as supposed, of being kept up in flesh and condition on poor strawy sorts of food, while working, so as to supply the place of the horse; as, were it otherwise, the farmer would long before now have discovered it; and though labouring horses should not be over fed with their proper expensive food, they ought not to be too much restricted in it for the work they are to perform, as they should never be suffered to be idle, but always pay for their food, whether of corn or any other kind. In keeping for draught, indeed, when every thing is taken into the account, the ox is as expensive as the horse, as more than two are always necessary to do the same labour; and when kept constantly in work, the time of the attendant is to be calculated, as well as the small extent of soil the animal works over in comparison with the horse, while the food consumed by the ox in the time of working, would in any other state make him fat.

It has been well observed, that it is a great but common mistake on this subject, to suppose that the most disadvantageous or detrimental consumption of the valuable and necessary produce of the land is by farm horses; since it is, doubtless, by other sorts of horses which are kept for road purposes, the use of the saddle, the running in coaches, and other carriages for luxury and show, for military service, and different commercial uses, that by far the largest proportion of corn is consumed, a proportion much less perhaps than three-fourths of the whole. However, though this may be the case, still the quantity of horses raised are indispensably necessary for those different uses of the country, and ought to be kept up, as if any reduction of them were by any means produced, the deficiency would be severely felt, and no supply of any other kind could be made to answer the same purposes.

As to the superior utility and benefit that may be derived by the store-master from the breeding or rearing of ox rather than horse stock, the latter may be made to afford an equal or larger profit than the former, by constantly providing young horses, and working them on the farm from two until the age of four, five, or six years; as the horse will go on improving until that time, then prove stationary in the money value for two or three years more, after which, declining as they before increased in worth. On the whole, the stock farmer should never on any account have an aged animal of the horse kind on his ground, unless it be of some particular good sort for breeding from, but dispose of them at the suitable age, to be worked out in other situations, where the loss may be less inconvenient and less felt from the larger profits that are produced.

It is by no means clear, as too commonly believed, that a larger quantity of beef would be raised and produced in consequence of a greater number of oxen being employed in team labour, as the length of time before coming to the market would be protracted to a much later period, and the oxen then require the same kind and quantity of food to make them fat as at a more early season, and of course, no advantage could be gained thereby, but evidently a great loss would be sustained, as that which would be ready in three or four years where they were not worked in such numbers, would not under the contrary practice be ready until from six or seven to ten; and, consequently, the produce in meat would be in the same proportion or more, and the general increased working of oxen be a loss of time as well as money to the individual as well as the public: for most sorts of such animals will reach three-fourths or more of their full weight before the period of their being capable of work-

ing, and it is the early production of meat that affords the greatest supply. Much stress has been laid by some on the difference in the ultimate destination of the ox and the horse; but that of the latter is by no means a total loss, as many useful purposes are thereby served, and even the consumption of other sorts of animal food is much lessened by the substitution of the flesh of the horse.

Oxen are objectionable as an expensive, unwieldy, and slow team in the plough, as four or more of the most favourable kind, when working double in the best manner with reins and no driver, and changed once in the day, are not capable of doing more than two horses in the same time; and wherever much expedition is necessary, as in putting in many sorts of seeds and plants, and at harvest-time, they are a very unsuitable and unprofitable sort of team, and may occasion much loss and inconvenience.

For carting, too, in many cases, they are quite improper as a team, especially when harnessed as the horse, for drawing single before each other; the proper mode is double, or in pairs, with yokes and bows, as, yoked in this way, the power of the ox in his neck or withers is so great that he can almost move any thing; while in the contrary way, in consequence of the increasing distance of the animals from the centre of draught, the power is continually decreasing, so that nearly twice the number would be required to draw a cart or waggon of the same weight an equal distance in the same length of time. Besides the former is cheap and simple, while the latter is costly and less convenient. In most steep, up-hill situations, oxen are less useful than horses for team labour, as well as for all sorts of irregular work, as that of harrowing in many cases. On all kinds of stony and flinty roads and soils they are also less useful than horses, as they cannot be shod so well as horses.

It is only perhaps on farms where the extent of rich pasture land is considerable, that a few oxen may occasionally be employed in team labour with benefit for some local purposes, as in conveying turnips and other roots or hay to the feeding cattle, in standing while dung is loaded and unloaded, in order to the carrying it out and putting it upon land, where a few hours' labour in the day is probably only required, and that but a few times in the week, half such time being passed in eating and consuming better food than straw. For such kinds of labour the ox is more cheaply kept, and more suitable than the horse, as being naturally more hardy when exposed to cold rain, snow, and frost: and as standing in such is less injurious to the former, while it is more prejudicial and hurtful to the latter; but for the general work of the horse they seem wholly unfit.

Thus the zeal and exertion of patriotic and public-spirited individuals, in so generally recommending and enforcing the use of oxen in preference to horses in team labour on farms, have, it would appear, sadly mistaken the main objects they had in view—those of benefiting and relieving the country from the supposed unnecessary consumption of its more valuable agricultural produce by teams of the horse kind; and thereby affording more abundance and plenty of useful food for its population. As, however, the working of oxen still prevails in some degree in different places, the proper sorts of them for the purpose, the manner of preparing them for such use, and the nature of keeping and working them to the best advantage, may be noticed.

PROPER KINDS OF WORKING OXEN.

The Devonshire or middle-horned breed, and its varieties of the less heavy of the Sussex and Herefordshire kinds, are most probably the best suited to the purpose in all cases. The first, from their fineness of shape and make, are the best calculated for use where swiftness is required, being the most light and nimble; and where less expedition is necessary, the large Welsh and Fifeshire sorts will be found beneficial. The Sussex variety is a good and useful sort for team labour, but being more weighty is somewhat more slow. The Hereford variety being still heavier, is most useful where the movement is slow and the work more heavy. A mixed sort between the Sussex and Hereford are excellent on some occasions. But the true Hereford sort seems to be the best for the combined purposes of moderate working and fattening; and the mixture of half this kind and half Sussex is nearly equal to it for most uses. The large Yorkshire and Lancashire breeds being very slow, and having much tendency to fatten early in the more improved sorts, are generally improper as draught oxen in any case. The true sort for supplying the place of the horse, as far as the difference in their nature, form, and habits admit of it, should in general be those which have a considerable lightness and nimbleness, as well as hardiness of make and disposition. Many sorts of oxen will do for performing slow, easy draught labour and fattening, but there are none probably perfectly suited to constant hard horse work.

TRAINING OR BREAKING IN.

In the business of training or breaking in oxen for work, which begins at from two to three years of age, they are usually at first attached and let run two together for some time by a soft rope fixed on the heads with a couple of feet or more of good small chain fastened at each end to the rope, having a swivel in the middle part, so as to admit of turning any way without twisting and incommoding the beasts. Others put them in yokes with old steady trained oxen before and behind them, holding them in the time of fixing them by the halter to which they have been used. But it is a still better way to yoke one of them with an old steady steer that is not too free to work, as by this mode of training, they are less liable to be injured in hot weather, as the latter will prevent the former from over exerting itself, which is sometimes encouraged by two being yoked together, as there is then no sort of check. In the outset, the work of the young oxen should be easy and gentle, so that they may be trained in the teams to labour with the other old steady ones; as whatever may be the work of oxen, it should always be made perfectly consistent with the increase in their value, as otherwise the stock farmer is well aware that the practice would be divested of the main part of its utility; and therefore the labour should at all times be so proportioned as not in any way to affect the growth of the beast, which continues until the sixth or seventh year. It is on this account that such numbers are worked in couples in the teams of some districts, and that the teams are so great in number, as wherever the necessary quantity for a team is exceeded, all the rest are in training. In most situations and most sorts of labour, the number of beasts in teams might be greatly reduced with benefit. The loads of teams of this sort are very commonly so trifling, when considered individually, that more than one half of the beasts usually composing them, might be spared without the least injury to the growth of the oxen. The trampling in working with such numbers of beasts double in the teams, where the soil is of the wet, tenacious,

clayey loom kind, must be very bad, as in such cases several are under the necessity of following each other in the furrows, as well as on the unploughed land; and in a wet spring, the last circumstance is most destructive, as all treading should then be guarded against with the utmost care. On such occasions, lessening the number of the beasts in the teams would, in some measure, prevent mischief; and at the same time prove a saving of food and labour. But, in fact, oxen are wholly unfit for the purpose in all such cases.

MODES OF WORKING OXEN.

The working of oxen has been usually attempted and carried on by the use of yokes and bows, and that of harness in somewhat the manner of the horse; but as to which is the best method, there is still a difference of opinion, some being greatly in favour of the latter in consequence of the animals working singly as well as more quickly, and the treading being thereby less; but as the power in the former is greater, as has been seen, from the beasts being placed abreast and nearer to the point of draught, it would seem, though the most ancient, to be the most effectual, especially as the pole and the yoke are now found to constitute the true lever of exertion for the ox. By way of fully deciding the matter, in a district where much is done by ox labour, cattle of this sort have been worked each way, upon a large scale, and in field as well as road labour; and practical experience has fully confirmed the more general opinion, that the old long established mode is superior to the new method, and that any number in yoke are equal to the same in collar. Harness has, therefore, lately been much laid aside as unsuitable and improper, as well as far too expensive. In the yoke and bow manner the work is also performed with more facility and expedition, as was found upon a further and more careful trial, and other advantages in working the land by such teams, and in road and other sorts of suitable labour, were at the same time ascertained.

In bringing up young oxen, whether for work or the supply of the market, they should, as already seen in the latter case, constantly be preserved in a suitable condition, so as never to be permitted to suffer in any case, or to be restricted in their growth by the want of suitable food, either in winter or summer, but should be constantly well kept. When intended for sale, they are usually disposed of at a proper early period, as the nature of the breed and circumstances may be, without being worked. But in the intention of working them they should be early trained as above, and be gradually brought into work at two or three years old at latest. In some districts, they are worked only two years, in others where the working breeds are more light and active three years, and in others from three, for four or five years. It is a common notion in some places, and believed by many, that if an ox be designed to be reared to the largest possible size, he must be worked, as when kept until five or six years of age without labouring, they conceive that he will not come up to the same size he would have done if he had been engaged in work. This is a point which would seem to admit of a different conclusion, and which should of course be more fully investigated and inquired into, as it is contrary to all known principles of living increase, that the more the powers of an animal are exhausted by labour the more it increases in size or growth.

It is a practice which can never answer any good purpose to the farmer, to permit his working cattle stock to get low or out of working

condition, since any little saving that may thereby be gained is nothing in comparison to the difficulty and inconvenience of bringing them again into flesh and heart; they should, therefore, at all times, but more especially when under the working system, be well supplied with dry food, in combination with that of other sorts, such as good hay, cut chaff, oats in the straw, and different substances of that kind; as by such keep, given in small quantities at a time, in conjunction with small portions of green food, they may probably be preserved in perfect order under the most severe labour they should ever be put to, but without which they must always be liable to get out of order. In common, the ox arrives at full growth and size about his sixth year, but the larger the animal the longer he is in reaching this point. It is thought unprofitable, under the working system, to keep oxen longer than the seventh or eighth year of their age, and for other uses they become profitable at a much earlier period, as has been already mentioned.

In whatever manner or sort of farm work oxen are employed in, it is always necessary that they be well shod before they begin upon it, as where this is neglected, or not properly attended to, they soon become lame and quite unfit for use. As there is often much trouble, difficulty, and risk, in casting them for this purpose, it is always better, and more convenient to have a contrivance of the frame kind, fixed up for this use in some proper place, by means of which they may be shod standing, without any danger or difficulty. An excellently useful machine frame of this sort is exhibited in the annexed plate, with the ox in the act of being shod.

KEEPING FOR LABOUR AND PROFIT.

The accounts and profits of the keeping and working of oxen must vary in no small degree, according to the nature of the system and manner in which the practice is pursued. In beginning with such young oxen as have been reared with this view to the age of three years, and at Christmas of the last year broken in for work, in the excellent and attentive practical management on the farm of the Earl of Egremont, in Sussex, as stated in the Report or Survey of that county, they stand somewhat as below, and are particularly worthy of the consideration of all those who work oxen in these views.

Beginning their hard work in the spring, their winter food from the above period is straw, with the addition of a ton and a half of clover hay at the most, which is given between the time of finishing the straw and going to grass; as during the season of spring sowing, and for some weeks before it, in order to be ready with them for that work about the end of the first week in February. They are then worked three, four, or five years, as from three years old to four, from four to five, from five to six, from six to seven, and from seven to seven and a half, being in this last case put after the wheat season to fatten. But a more common system is to work them four years and a half, and then fatten them.

When at straw in the winter, they work three days in the week, as there are thirty-four, namely, twelve three-year olds, ten four-year olds, and twelve of all ages above that, as they turn out to be good for work. And it is remarked, in regard to turning off from work, that when an ox will not bear hard work and hard keep, on an even chance, he may, if put to feed, fatten as well as one that would stand work and hardship much better, as the qualities of fattening and bearing hard work are quite distinct and separate. But the perfection of breeding such sorts of stock is to have those which will do both; while the freeness and

willingness of temper in the working ox may lead to the supposition of his being tender and unfit for labour, if this circumstance be not well attended to.

The above thirty-four oxen are at oat straw, with no other sort of keep, and sixteen of them are worked every day; and the very good order they were in was readily seen, none of them shewing by their appearance any want of better keep. This straw system holds, it is said, until about the 10th of February, when hay is given to prepare them for the fatigue of spring seed-time; the hay system lasts until May, when they are turned out to grass. In bringing forward an estimate of the value of their work, in order to be within the truth, only a part of their time is here stated to be taken into the account, namely, the period they are at straw in the winter, and at grass in the summer, as shewn below.

Years old.	*Days.*	*d.*	*Weeks.*	*l.*	*s.*	*d.*		
From 3 to 4	2	at 6	18	0	18	0	At Straw.	*Winter.*
—— 4 — 5	3	— 7	. .	1	11	6		
—— 5 — 6	3	— 8	. .	1	16	0		
From 3 to 4	4	at 6	34	3	8	0	At Grass.	*Summer.*
—— 4 — 5	5	— 9	. .	6	7	6		
—— 5 — 6	5	— 10	. .	7	1	8		

The expense and return of these oxen are calculated in the manner they are managed, the whole taken as a single one.

	l.	*s.*	*d.*
Expense of weaning	2	0	0
Six months' good grass, at 10*d. per week*	1	0	0
First winters' six months' grass, at 1*s.*	1	6	0
Six months' grass in park, much fed with deer and sheep, &c., at 1*s.*	1	6	0
Six months' wintering, at 9*d.*	0	19	6
Six months' grass, at 1*s.* 6*d.*	1	19	0
	8	10	6

At this time, or even so early as in August, they could be sold for 11*l.* or 12*l.* lean.

	l.	*s.*	*d.*
Suppose	11	10	6
Have cost	8	10	6
There would here be profit	3	0	0

Supposing the food charged to November: or, on the contrary, if put into good grass in August, for fattening, they would by the end of the grass season, about the time to be broken in, sell fat to the butcher at 15*l.* or 16*l.*

	l.	*s.*	*d*
Bring down	8	10	6
Twelve weeks more valuable grass (as of 3*s.* 6*d.* instead of 2*s.* 6*d.*) 2*l*	1	4	0
	9	14	6

	l.	*s.*	*d.*
Sell for	15	10	0
Expense	9	14	6
Profit	5	15	6

This is a statement on an average; but some beasts turned from work to fatten, become excellent beef, and weigh rather heavy, and would fetch 23*l.* or more. This would be a considerable profit, but as if generally practised, it would exclude the system of working oxen, and force the use of horses for the entire work of the farm, it does not seem to be so large as to induce that change of the system, and accordingly the calculation does not stop here.

	l.	*s.*	*d.*
Bring down	8	10	6
Six months' straw, the third winter, at 1*s.*	1	6	0
Six months' grass, at 2*s.*	2	12	0
Three months' straw, the fourth winter, at 1*s.*	0	13	0
One ton and a half of clover hay	3	0	0
Six months' grass, at 2*s.*	2	12	0
Three months' straw, fifth winter	0	13	0
One ton and a half of clover hay	3	0	0
Six months' grass, at 2*s.*	2	12	0
Three months' straw, sixth winter	0	13	0
One ton and a half of clover hay	3	0	0
	28	11	6

If the account be here closed, by a sale when lean, (which is not his Lordship's practice,) it may, for the better comparison of keeping and fattening, be thus stated:

	l.	*s.*	*d.*
Would now sell for . . .	19	10	0
Earned before	21	2	8
Expense	28	11	6
	12	1	6

This would be the account if sold in the spring; but if deferred to the succeeding autumn, the lean account will then stand thus:

	l.	*s.*	*d.*
Bring down	28	11	6
Six months' grass at 2*s.*	2	12	0
	31	3	6
Earned before	21	2	8
Six months' work, 5 days a week, at 10*d.* . . .	5	8	4
	26	11	0
Sold for	19	10	0
	46	1	0
Expense	31	3	6
Profit	14	17	6

But as on this farm, at this period, some are put to fatten, the account, of course, goes on thus:

	l.	*s.*	*d.*
Bring down	31	3	6
Six months' rouen, the seventh winter, at 2*s.* a week; if not enough of it, then bad hay, two tons and a half, at 30*s.*	2	12	0
Six months' and three weeks' grass, at 3*s.* 6*d.* .	5	1	6
	38	17	0
They may now be sold for	30	0	0
Earned before	26	11	0
	56	11	0
Expense	38	17	0
Profit	17	14	0

It is here noticed, that four oxen, two of which were ten years' old, and the two others coming eight years old, were seen feeding upon rouen in January, through severe frost at the end of December, and without any other food, and thriving well: a very satisfactory proof how much such sort of keep is to be depended upon, even in such a season, and of the great profit attending it. There can hardly be a clearer exemplification of the advantages of kept grass than this practice affords; for no slight portion of the profit throughout the scale, arises, it is said, from the cheapness of this food. The calves wholly depend on it for the first winter of their rearing: it forms part of their food, also, the second, though then at straw; and the winter previous to fattening, the oxen are put to it to improve them. Its value is best ascertained, by supposing its absence; for, in that case, hay must be its substitute, and the expense of that food would be very great. This sort of food is excellent for lambs, and some other stock. And, in short, it relieves the stock-master from a dependance on the seasons, and removes all ground of anxiety. But to proceed with the account:

	l.	*s.*	*d.*
Bring down	28	17	0
Three months' oil-cake, eight cakes a day, at 8*l.* a thousand at the place of sale: carriage, including all expenses, 24*s.* per thousand; 90 days, at eight cakes each, 720, 17*s.*	6	12	0
Three months' hay, with cake, at 8lbs. per day, 720lbs., say half a ton, at 3*l.*	1	10	0
	46	19	0
They then sell for	32	10	0
Value of work before	26	11	0
	59	1	0
Expense	46	19	0
Profit	12	2	0

Difference of profit, lean or fat, 2*l.* 15*s.* 6*d.*; against which there is to be reckoned the value of the dung.

But the more common practice of his Lordship is, to keep them longer before fattening; in which case, the account proceeds thus:

	l.	*s.*	*d.*
Bring down	31	3	6
Three months' straw, seventh winter	0	13	0
One ton and a half of clover hay	3	0	0
Six months' grass, at 2*s.*	2	12	0
	37	8	6

If then sold lean, the account will be:

	l.	*s.*	*d.*
Work done before	26	11	0
Eighteen weeks, at three days a week, at 8*d.*	1	16	0
And 34 weeks, at five days a week, at 10*d.*	7	1	8
	35	8	8
Sold for	19	10	0
	54	18	8
Deduct expenses	37	8	6
Profit	17	10	2

It is here remarked, that the profit of keeping an ox at work while he is in full strength, is an object, as his labour amounting to 8*l.* 17*s.* 8*d.*, and his food only to 6*l.* 5*s.* 0*d.*, leaves a profit of 2*l.* 12*s.* 8*d.* in the year. Nor is it believed, that by thus keeping him through the summer, which follows his seventh winter, that he is worse in any respect, either for fattening or selling in the fat state.

If now fattened, the account continues thus:

	l.	*s.*	*d.*
Bring down	37	8	6
Six months' rouen, as before, eighth winter, at 2*s*	2	12	0
Six months' and three weeks' grass, at 3*s.* 6*d.*	5	1	6
Oil cake, as before	6	12	0
Hay, ditto	1	10	0
	53	4	0
Work done	35	8	8
They would now sell for	32	10	0
	67	18	8
Deduct the expenses	54	18	6
Profit	13	0	2

Upon this account, which is not an imaginary calculation, but a transcript from actual practice, it is remarked, that his Lordship seems to think it extraordinary, that the farmers are generally fond of fattening their oxen, by which they lose, and that nine-tenths of the kingdom are unwilling to work them, by which they would as clearly gain: which is partly to be accounted for, in the first case, by the vanity of having fat oxen, which is an object among them of a sort of pride, as if a certain degree of respectability attached to the practice: an idea not altogether erroneous, as far as manure is concerned and connected with it.

It is evident, it is said, from the whole of this account, that the advantage of working oxen on his Lordship's farm is sufficiently clear and manifest: but, that it should be noticed, that this practice is to be extended no further than it actually has been, that is, keeping both horse and ox teams. A great deal of the soil of his Lordship's farm, especially the arable, is a strong clay; upon which it is very material not to trample in ploughing, and where it is of equal importance in spring and autumn seed-times, to be very quick in catching the right moments: horses, for such occasions, trample less, and are more expeditious. It is, therefore, found particularly serviceable, to do all sorts of carting with oxen, except long journeys, and at such seasons to keep the horse teams uninterruptedly at plough. It is not, however, to be hastily concluded, that oxen do not plough well, for they certainly do on this farm, but in the spring and autumn seed-times horses are more quick and ready. Six oxen, for the first earth, in stiff land, plough but three-fourths of an acre a day, on the average of the several ages at which they are worked. Those who, on lighter soils, can make use of smaller teams, will, of course, find them more beneficial than is shewn by this statement. In this manner of keeping and working, though profitable, they by no means answer the purpose of horse labour.

HEIFERS IN PREFERENCE TO OXEN.

How far heifers may answer the purpose of oxen in draught has not yet been well determined; but there can be no doubt that they are a far more profitable sort of stock to raise in every other view, as oxen for work can only be required to a limited extent, where they are considered even in the most favourable light. Some believe them to have a great superiority over oxen, with a view to fatten at any age, either with or without breeding from them; and that on the same extent of land they would produce more weight of beef. They ripen more early, beside the benefit of their milk, in case they have young. If of the proper breed, they will fatten at grass only, without having a calf, so as to produce a great weight of beef annually, while the ox consumes a great deal more grass, without producing yearly any thing near so much weight of meat. And they may be made still more productive if milked a little and fattened in the fourth year of their age; there being then the profits of different products from them, as of calf, cheese, or butter, and meat, which would amount to much more than the produce of an ox, whether worked or not, in the same space of time. When spayed, they have always been considered, by the best informed farmers, to be quite equal in labour to oxen, and it seems not improbable, that they are still more beneficial when kept open, both for work and their produce in other ways, and they are certainly much more quiet and manageable stock. Where they have been employed in team labour there has been little difference noticed in the work, while they have been managed with half the trouble or less.

PROPORTION OF SUCH WORKING STOCK TO BE KEPT.

As the fattening or concluding part of the system of working oxen often turns to the best account, in so far as profit is concerned, there is much reason and propriety in having such numbers of them upon farms, as may be consistent with their thriving and growth while at work, as their increase in value during the whole course of their continuance on the farm is a main point in the business. Yet in some districts, the teams of this sort are so very numerous and large, that they might be greatly lessened, as has been already seen, with considerable benefit in several respects.

They might be reduced in many places, to nearly half their number, by using the more aged, or those that are less in danger of injury by work, and keeping the whole one or two years longer. For though this longer keeping would not probably increase the value, the expense of working the land would be lessened, and the damages done to it would not be so considerable.

The proportion of draught oxen to farms, in this manner of working, must necessarily vary with their nature, size, and the quantity of horses kept: and in this respect, there is a material advantage in large over small farms, in the cheaper mode of their cultivation. A horse and an ox team are necessary on a farm of an hundred acres, that is, eight oxen and four horses, in most ox-working districts; but if it be increased to two, three, or more times that extent, the quantity of draught cattle required diminishes in proportion. Some think twelve oxen and nine horses to be the most proper ratio on two hundred tillage acres, when they work constantly; though the usual rate is higher, but the above is given on the authority of actual extensive practice. On heavy, deep, adhesive, and rich land, eight oxen and three or four horses are employed for one hundred acres on some occasions. On strong clayey loam, two-ox and one-horse teams are required on one

hundred and thirty acres. The same in other cases of lighter loams. On light, chalk, flinty rubble, fourteen oxen and six horses to two hundred and fifty acres. On heavy land, four oxen and six horses. On other less heavy sorts of land, fewer oxen and horses will be sufficient. but the variations are considerable in different places, yet these instances may shew the general proportions in such cases. The houses and other conveniences most proper and economical for oxen, as well as other sorts of neat cattle-stock, will be considered in their proper places.

Section VII.—*The Cow, or Female Animal.*

Much nice attention is necessary in raising proper cows. The principal marks of good cow stock, have usually been considered wide horns, thin heads and necks; dewlaps not too large, full breasts, broad backs, large deep bellies, the udders capacious, but not too fleshy; the milk veins prominent, and the bags not tending too far behind; teats long and large; buttocks broad and fleshy; tails long and pliable, legs proportionable to the size of the carcase, and the joints short. To these outward appearances should be added a gentle disposition, free from any vicious tricks, and perfectly manageable on every occasion; while, on the contrary, cows with thick heads and short necks, prominent back-bones, slender chests, bellies tucked up, small udders or fleshy bags, short teats, and thin buttocks, should be avoided as totally unfit for the purposes of the dairyman, the suckler, or the grazier.

Some consider the best cow-stock to have the following forms and appearances of their different points or parts, besides those just noticed; a thinness in the chaps or jaws; the horns not large, but placed high on the front of the head; the eyes neither too lively nor too dull; a thinness and lowness in the necks; little or no loose skin or dewlap hanging down; a narrowness in the breast parts, as well as in the upper parts of the shoulders; a lightness in the fore parts, a hollowness behind the shoulders, and little fleshy on the chine; rump and hucks tolerably shaped; a thinness in the thighs, and often a crookedness in the hind legs; longer in the fore than hind legs; more let down in the hind than in the fore parts; but little disposed to be *fleshy* any where; very thin hides; small in the tails, with little hair; and free from coarseness of hair in any part. But it happens sometimes, that with all these qualities, cows milk but indifferently; it is therefore very necessary to attend to other properties of their particular parts: thus the udders should not be too large, but have an equality of substance in the feel, otherwise they may have more disposition for flesh than milk; yet sufficient substance is proper for containing the necessary quantity of milk, but the more it shrinks after milking the better. Every part of the udders of cows, before milking, should feel exactly alike, and not lumpy or knotty. The external coats or coverings of them should be very fine and thin; the teats have a sort of tapering form downwards, being thickest at their coming off from the udders, and diminishing to a sort of bluntish point at the bottoms, so as that the apertures for the discharge of the milk may not be so large as to let it trickle, or drop out too abundantly; they should stand in a kind of square, equidistant manner on the udders: the appearance of the udders in cows should be nearly the same behind as before, but if any, the most in the latter position, as the contrary denotes a more speedy decline in the milk after calving.

However, though cows thus formed in their

different parts are most certainly to be depended on as good milkers; sometimes young small cows, well-formed in their general shape and milking parts, will give very large long-continued quantities of milk, and answer better than cows of larger size. But those cows which have much propensity to fatten, commonly differ very materially from those which afford milk in large quantity, especially in their udders, and the veins for the milk, which are much smaller, and without any loose skin in any part; the hides of them being of the medium degree of thickness, as very thin hides mostly denote leanness, and the hair somewhat long and thinly set.

As however there are many instances of cows of the most perfect shape which give large quantities of milk, it is important and desirable to unite the two properties of great milking and fattening in the same animal, which of course must render such stock much more beneficial to individuals, as well as to the whole community. This improvement has been effected in the short-horned breed as already seen, and may be also in other cases, by making use of males taken from such cows as are perfectly formed, well-descended, and have good fattening dispositions; and thus, by getting young stock from cows that have the best properties for milking, and continuing to proceed in the same manner with their future produce, a breed combining these advantages will be fully established. The cow, that has this union of good qualities, can at any age be sold for a good price, while that which has only the property of producing milk, will at last be worth very little to the butcher.

Of this useful animal there are several breeds and varieties, which differ materially in their habits and uses, so as to suit the different views and purposes of the keepers of such animals. The most valuable cows are perhaps those which are bred in Yorkshire, Lancashire, Staffordshire, and upon the strong land in other parts of the kingdom, which being of the largest size, yield great store of milk, when turned on pastures where the grass is in sufficient abundance, or fed with a constant supply of such food as from its succulency conduces much towards the nutriment of the cow, and enables her to give large quantities of milk, such as turnips, grains, garden vegetables, and others of similar kinds. But as these large cows require a more ample provision than would fall to their share on the generality of farm pastures, they should not be kept by those farmers whose land is not of the most fertile kind: for, on ordinary keep, a small cow will yield a greater profit than one of the Yorkshire or Staffordshire breed, which, having been bred on the best kind of land, would be starved, where a Scotch or a Welch cow would find an ample supply of food.

Besides the improved Yorkshire short-horned, and the Lancashire long-horned, kinds, which are probably in general the most useful and advantageous sorts of cow-stock, there are others which are occasionally made use of, and found beneficial in different cases, as the mixed Herefordshire, which are large, handsome in form, and sleek in the coat, but only suited to the richer sorts of land, where the herbage is sweet and abundant. They usually afford a fair proportion of good rich milk; and when they come to be fed, they generally fatten well, and weigh heavy.

The North Wiltshire, too, are of a large kind, adapted to the same sorts of land. They afford an abundant supply of good fine-flavoured milk, which, as well as the above, is productive in both cheese and butter: they have likewise

the property of fattening well when they have done milking.

The Devonshire breed is somewhat similar in size, and thrive well under middling keep, standing the winter season well, and are thought by some to be a profitable sort for the dairy.

And the Sussex variety of this breed, while they have a great disposition to fatten, are highly valuable for the quantity of butter they afford: so that though the Yorkshire and Suffolk cows are probably by far the greatest milkers of any; yet the difference of their value is not, probably, on the whole, so much as is often supposed.

In the smaller sorts, the North and South Wales cows do well on the poorer sorts of lands; the former, though small, give a large quantity of milk, and are in some situations very profitable: the latter, also, on middling sorts of pastures, afford a good supply, and on good lands their produce is abundant.

The Kiloe sort answer well on land of a similar description, and give an excellent kind of milk: they have also the property of fattening well after the milking season is over.

The Suffolk Duns are highly esteemed for the use of the dairy, being productive in milk, though deficient in the supply of butter, when compared with the long-horned sort.

The French sort of cows are celebrated for affording fine rich milk, but less in quantity than most other kinds; the butter, however, is excellent in flavour. They do tolerably well on almost all sorts of land, and, when fattened, produce very good beef; but are only suitable where a quantity of the milk, cream, and butter, is not much required.

But besides these, there are many mixed sorts, which not unfrequently turn out good and useful milkers, in different views of the dairy farmer.

However, though the cows which are naturally inclined to fatten may occasionally give pretty large quantities of milk for a while at first after calving, they will soon, in most cases, begin to decline, and before long quite fall off in it, being constantly more full in condition than the larger milking sorts, except those of the really improved kinds in that view.

As it does not appear, from the many trials that have now been made, that large cows consume any great deal more food than small ones, let the sorts of either be what they may; it would seem, that it must always be greatly disadvantageous in every point of view, to have inferior sized cow-stock, than that which is capable of being kept in any case; as the largest of such sorts of stock that can be supported, and especially if it combine the properties of ready fattening and deep milking, will be the best, as giving the most produce, and not requiring much more keep to put it in condition afterwards.

These are the principal different sorts and varieties of this useful animal, which serve to suit different uses and intentions in farming; and there is scarcely any sort of farm which does not admit of keeping a few of some sort or other of them; but regard should always be paid to the condition of the soil in providing such stock.

In the practice of raising proper cow-stock, great care is requisite to select such cows as afford good milk in large quantity, and for a sufficient length of time, with the least consumption of food, and which are perfectly well descended. The sorts of cows which are the most esteemed for yielding the largest proportion, and continuing it the longest, are of course to be preferred in the production and rearing of such stock. All sorts of inferior cow-stock should be wholly avoided.

PUTTING YOUNG COWS TO THE BULL.

The particular period of time at which the young of this kind of neat cattle-stock should be brought to the state of becoming productive, is not yet probably exactly ascertained, as, in all cases, much must obviously depend on the nature of the breed, situation, and kind of keep by which it has been raised: for where the former has been favourable, and the latter rich and abundant, it will be much sooner ready for such purpose than in the contrary circumstances. The fact, that in districts where formerly, from the state of the land, the young cow-stock were not permitted to take the male until about three years old, and now, from being since improved, allowed to take him at one, and become productive at two years old, is evidence strongly in confirmation of this point. The inducement for bringing them in at two years old, arises from their sooner coming to profit, and the breeders and rearers being unable to let them remain unprofitable until three years old; while, on the contrary, the bringing them in at three years old, prevents their becoming stinted in their growth, and they become larger and finer cows than in the other case. The particular advantages of these different times of rendering them productive have not yet been sufficiently shown; but as there can be no sort of doubt, but that some detrimental check must be given to the growth of the young cows themselves, as well as to their calves, by such early production (since they cannot take in and convert the quantity of food which is necessary for their own increasing growth, and that of the perfect support and increase of their young), it may be most beneficial to pursue a middle method, according to the nature of their keep: as for instance—on rich land, where the above injurious effect may be best prevented, at two years old, and in other circumstances of inferior keep, at two and a half or three. The advantages of the breeder and keeper will thus be best secured in all cases, and their stock the least in danger of injury. However, in order to make young cows or heifers take the bull at so early a season, it will be necessary constantly to keep them well. Some think the benefit of preventing this too long is no ways useful in producing better stock. As, however, when this is too long protracted, they are more apt to miss having calves, it may, in common, be best to let such young cow-stock take the bull at two years old, or a little later. When fat and kept long before the male is put to them, they are liable not to stand the bulling, but which may be prevented by letting them have inferior keep. All cow-stock, and particularly that part of it which is in calf, should be as well kept as circumstances will allow, and be likewise well sheltered from cold and heavy rains, during the whole of the more inclement seasons, as by such means they are preserved in better condition, calve with more safety, take the bull again much sooner, and are more beneficial in their milking.

Inferior sorts of keep should as little as possible be had recourse to with this kind of neat cattle-stock, as no advantage or benefit whatever will be derived from bad keeping, while there is a considerable loss in the young heifer-stock not becoming productive or profitable by the difference of nearly a whole year. When forced to become too early productive, there may, however, be less safety in their calving. Where intended for fattening, heifers should not be later than two, or two and a little more years' old, in taking the bull, as in such cases, by the time they have had calves and suckled them, with the period necessary for fattening afterwards, they will be of quite sufficient age for the butcher. When they have had a calf they

fatten better and more quickly, as well as tallow better and more fully, than such of the same standing as have not had any, while there is the profit of the calves, whether sold or retained as store-stock.

In taking the bull, the cows should seldom be served more than once, in order that the irritation and straining which is sometimes brought on by repeating it may be prevented, as well as the danger which may be thus produced. The most proper periods or seasons for cows taking the bulls must be wholly regulated and directed by circumstances; but it is always beneficial to have the calves dropping at such times and seasons, as they may be best disposed of for fattening as veal, or for being raised as store-stock.

In the former of these views, therefore, the calving sufficiently early in the commencement of the new year, while such products are the most valuable, is supposed the most advantageous: and even in the latter view, some think it so, as the calves can be got forward in the most beneficial manner; while others consider it best to have them calve when there is a good bite of grass on the land, particularly with their first calves, as the cows are believed to make better milkers afterwards, in consequence of the milk-secretion being at first more fully and strongly formed and excited.

These points will hereafter be more fully considered, in treating of the nature and manner of fattening and rearing calves and young neat cattle-stock.

The milking of cows should always be regularly, perfectly, and mildly performed. Cows are usually in full milk about the fourth or fifth year of their ages, and will continue so eight, ten, and many more, in some instances and situations; but under many practices, they cannot be kept longer than three or four years.

OPERATION OF MILKING.

Much greater attention than is commonly bestowed, is necessary to the operation of milking, in order to procure the largest possible quantity of milk, and at the same time prevent injurious effects. If this business be improperly performed, not only a great deficiency in the amount of the milk will be the effect, but the cows will become sooner dry, and be more disposed to affections of the udders and teats. In milking, care should, therefore, be taken that the whole quantity be completely and regularly drawn away at the times which are in common use, and that no sort of intemperance or violence be employed towards the cows. Simple as the business of milking is, there seems to be something of an art in it, as some milkers press and force the milk out of the teats much more easily than others; and to such the cows are more disposed to yield their milk, and continue it longer; but no circumstances should, of course, prevent its being wholly taken away at each milking. It is greatly beneficial to have the cows fed at the time of milking, as they then give their milk more freely and fully. Confining the hind legs of cows, by means of hopples or short hair ropes, for the purpose, is also useful, and sometimes necessary, whether they be tied up or in an open state, while the work is performing, as it prevents many unpleasant accidents. It is a cleanly and beneficial practice, to wash the udders and teats of the cows with cold water, as the work thereby goes on more pleasantly, and injuries to the parts are by this precaution frequently prevented. The best mode of milking, with a view to the increase of the secretion, and the complete discharge of milk from the udder and teats, has not yet been decided; but as the whole of them form a congeries of glands, which together constitute the secretory organs

of the animals, it is not material, perhaps, which is first drawn; though some prefer the teats on one side, and some the other, but on no account crosswise. The main point is, to draw the whole of the milk cleanly away at each milking, which is the most effectually done by gently rubbing the flat hand over the whole of the udder after the first portion has been drawn, and then trying the teats again, until the whole be discharged. It is often useful too, when it can be done, to have the cows *stripped* after some little time, as they will, in many cases, again give a good quantity of milk of the best quality, though there was none just before.

We know, from the nature of secretion in glands, that the more frequently a secreted fluid is taken away, the more the quantity is increased; and it has been, consequently, advised, to have recourse to more frequent milking, in the view of increasing the quantity of the milk. By thus inducing the habit of more frequent secretion in such organs, it can hardly be doubted, but that a more abundant quantity of milk may be gained in a certain length of time; but in that case, a more full and high state of keep for the cows will be necessary, and greater regularity and exactness will be required in the fixed periods of milking, with more care and attention in drawing away the whole of the milk at each operation. The few trials, which have been made with this view, fully show, that while the cows are feeding on the more rich and juicy sorts of food in the spring, there is an increase in the quantity of the milk, by three and four milkings in the course of the day; but that in the autumn, when they are consuming the drier sorts of keep, there is rather a deficiency or decrease in the proportion. Fully to decide the point, however, more lengthened trials are necessary, with greater variety in the times of milking, and closer and more exact comparisons of them with the qualities and quantities of the food consumed; so as to shew how much depends on the simple circumstance of taking away the milk, and how much on the nature and quantity of the food that is eaten. Whether any sufficient increase in the quantity of the milk can be gained in this way, so as to compensate for the trouble and expense, in large undertakings, is not well ascertained, but in small concerns it may probably succeed.

In most cases of cow-keeping for the sale of milk, the practice is, to have the cows milked only twice in the course of the day and night, about seven o'clock in the morning, and five in the evening; but in the vicinity of the metropolis, and some other large towns, it is the custom to have this work performed from about four to half past six, in the morning, and from about half-past one to three or more, in the afternoon, for the convenience of the milk-carriers. In such cases it is, therefore, necessary to have the milking performed by careful persons, who are well accustomed to the nature of the work, in order that it may be done with expedition, and in the cleanest manner possible. As an expert person at the business is capable of milking about seven cows in the hour, it is proper to provide them in about that proportion to the number of cows that may be kept.

RENDERING COWS DRY OF MILK.

Where the herd is extensive, an account should always be kept of the period when each cow takes the bull, that she may be dried off at a reasonable distance of time before the expected term of gestation be completed. The most proper time for the cow to be dried off is about two months before her calving, when she ought to be suffered to lie quiet, and not be brought up with the other cows at the milk-

ing or suckling times; for, if a cow be continued in milk nearer to the time of calving than the period above allotted, it will not only greatly injure her future progeny, by rendering it weakly or stunted, but will also have an ill effect on the health of the cow herself. Under good keep, she may, however, be milked some weeks longer, as much in this business must necessarily depend on the manner in which the cows are kept. When they are well fed, they may be continued in milk till within a week or two of their calving, without suffering any injury whatever from it; but in the contrary circumstances, it may be better to let them run dry for a month, six weeks, or more, according to their condition, in order to their more fully recruiting their strength. It appears, however, not improbable, but that the longer the milking is continued, the more free the cows will be from indurations and other affections of the udder, which is a circumstance deserving of attention. Where only one or two cows are kept for the supply of a family, it is likewise useful to know that by good feeding they may be continued in milk, without any bad consequences, till nearly the time of calving. This method has been tried several times, without the least injury arising from it; and in some parts of Yorkshire, it has been stated, that no advantage whatever was found, on trial, to result from allowing the cows to go dry two months before calving; they have there been kept in milk till within ten days of the time of dropping the calf, without the least injury in any way.

The most proper time for drying the cows before calving is most probably indicated by the milk becoming a little saltish in the taste, and then they should be immediately suffered to become quite dry, which mostly takes place without any trouble or difficulty; but where this is not the case, the necessary means must be had recourse to.

There is more difficulty to effect this in some cases than others, in proportion to the quantity of milk that may be given, and the state of condition in which the animals are at the time. Such cows also as are liable to let their milk slip, are more difficult and troublesome in drying of it than others. Some cows may be dried as well in the pastures as in houses or other places; but others, which part with their milk readily, are best rendered dry while feeding on dry fodder. Those which abound in milk, are in good condition, and in pastures, may be best managed by being brought up at night into the yards, and should have a powder, as below, given them in the morning; being clean milked at the time, and soon afterwards returned to the fields. In a few days, when the udders of the cows are again become hard and full, they may be a second time brought up, be clean milked, and have the powder repeated, which is generally sufficient for the purpose, in common cases. But some abound so much in milk, that it is often necessary to have recourse to the powder and clean milking, at intervals of a few days for several times before the business of drying them can be perfectly accomplished. Such milking should, however, be as seldom repeated as possible, in order to lessen the habitual secretion of the milk in the glands of the udder:

Take of—Dried alum, in fine powder, four ounces,
Gum kino, in powder, six drachms,
Oak bark, in fine powder, two ounces;
mix and make them into a powder, which is to be given in a proper quantity of verjuice, or good vinegar and water, in the morning, for several times.——Or,

Take of—Alum, in powder, three ounces,
Tartar of red wine, in powder, six ounces,
Extract of logwood, in powder, half an ounce,
Root of bistort, in fine powder, one ounce;
mix and form a powder, to be given as above.

While taking these powders, the bowels of the animal should always be kept properly open; and by such means cows in most cases may be well and safely dried of their milk where it becomes necessary.

The means of inducing or disposing cows to take the bull are more difficult and less useful than those of rendering them dry, except in certain cases, as where the seasons of profit for their products may otherwise be lost; nor will such means often be wanting where the animals are sufficiently healthy and in proper condition, which is much the best and most certain criterion of success. When such means are, however, necessary, those which are given below are excellent, care being always taken to adapt them to the differences in the size and the state of the beasts.

Take of—Fennel water, six ounces,
Spirit of juniper, two ounces,
Tincture of black hellebore, half an ounce,
——— of capsicum, six drachms,
——— of blistering fly, or cantharides, from two to three drachms;
form them into a drink, which may be given in a quart of the decoction of linseed or thick gruel any time in the day, the cows being kept without food a short time afterwards.

Some prefer the following powder for this purpose, but it is more apt to cause heat and irritation in the urinary passages:

Take of—Blistering fly, or cantharides, in fine powder, from a half to one drachm,
Black hellebore root, in fine powder, half an ounce,
Powdered capsicum, six drachms,
Juniper berries, in powder, two ounces;
mix them into a powder, which may be given in the same manner as the drink above.

Where these medicines are productive of the intended effect, it will mostly take place in a short time, but if it should not, they may be repeated once or twice.

If there should be any tendency, brought on by such means, to a difficulty in the passing of urine with pain and irritation, it will be necessary to have recourse to the use of nitre, with the powder of linseed in large quantities, to which a little powdered opium may be occasionally added with good effect.

When a cow is four months gone with calf, the fact may be easily ascertained by pressing upon her off flank, where the calf will be felt to kick against the hand. These animals generally show their desire for the male, or taking the bull, by riding upon the other cows, and by the turgid appearance of their shapes or bearings. They should be well attended to at these periods; and it is useful and convenient, on many accounts, to have bulls with them where they are kept in any sufficient quantity, such as preventing much trouble, saving time, and rendering the business far more certain; as well as inducing the cows to take them. But where they are backward or shy in taking the male, it is the practice of some farmers and breeders to give them two or three pints of the milk of such cows as are in the bulling condition, before they have taken him. However, the giving of a very small quantity of the tincture of the blistering fly in such milk would be far more effectual in exciting such a propensity in cows, which are defective or tardy in this respect. A drachm, or thereabouts, will mostly be sufficient for the purpose, but it is commonly better to avoid it, if possible, as such cows are seldom worth much as cow-stock.

Towards the time of calving, cows are not unfrequently liable to be in a constipated state of the bowels; and in consequence to have, in many cases, a difficulty in passing their urine; which should always be well attended to, in order that the loss of their calves may be prevented. In cases where any thing of this sort is shewn by little or no dung being dropped, and by frequent ineffectual efforts to void urine,

strong saline laxative substances and warm oily clysters should be used, until the proper effect be produced. Let eight or ten ounces of the common purging salts be dissolved in three pints of thin gruel, and four or five pints of water just warm, and made into a clyster, with a little common salt and a few ounces of oil of the linseed or some other ordinary kind. By such means, the calving will mostly be rendered safe and easy, and any retention of urine be avoided or removed.

After what has been said, before considering the nature and circumstances of calving, it will be necessary to take a view of the bony, muscular, and internal structure and situation of the several parts of the animal.

SKELETON,

OR

STRUCTURE AND FORMATION OF THE COW.

In the bony, muscular, and other structure, as well as the nature and situation of the several internal visceral parts, there is a very material difference in the cow from those in the horse and other domestic quadrupeds. In the former there is less length, but more depth of the body part; the ribs in the horse being more in number, and extend further back towards the hind parts, while in the cow, though fewer, they have more length in the hind ones, which gives greater depth and capacity to the body or barrel, but less roundness. There is much variation in many other parts in the different animals, which will be noticed in considering the several parts which form the skeleton of the cow. The muscles in many parts are more rounded, and have a greater fulness than in the horse, without the fineness and strength.

Section 1.—*Bones.*

The colour of the bones in most animals is pretty similar, but in the large ones of the cattle kind it often varies, even in different parts of the same bone. They are covered by a periosteum, and contain a fat animal oil, or what is usually called marrow; and the perfect formation of them is accomplished sooner or later in proportion as the animal is quicker or slower in attaining its full growth. In the substance of the horns, there is found more *gelatine* in proportion than in the bones.

The whole connected bony parts are usually divided into HEAD, TRUNK, and EXTREMITIES; the last of which, in consequence of moving horizontally, are termed *anterior* and *posterior*.

HEAD.

This in the cow and neat cattle kind is about one-half in proportion to the face, but in the horse it is not more than one-fourth where the formation is good. In animals of the cattle kind, and those that go on all fours, the large occipital foramen is situated more backwards in proportion as the face is lengthened out; in order to compensate for which, the head is suspended by muscles of great strength, as well as by the legamentum nuchæ placed upon the upper part of the neck.

Neat cattle of the horned kind have the os frontis mostly divided by the sagittal suture for a great length of time; but in the horse, the whole forms only one parietal bone. In the former, the os sphenoides is similarly connected as in the human cranium, and the denticulations of the sutures are very evident. The occipital ridge has much projection. The ossa malorum are of considerable increasing bulk upwards. The lower jaw has much length in proportion to the cranium. The condyles of

them are rounded in their form, in order to allow of motion in all directions, so as to fit them for grinding and reducing their food in the best and readiest manner. They have the lateral portions of the jaw united into one piece, which is not the case in some other sorts of quadrupeds. The great length of the jaws seems to be caused by the depth and situation of the superior maxillary bones, and when standing in the usual horizontal posture, the head is supported by muscles, and by the ligamentum nuchæ, which are mostly strong in proportion to the weight of the head. In the zygoma there is but little of an arch outwards, and the foramen ovale is of large dimensions.

The Os Hyoides in the cow is divided into the body and cornua, and the larger ones, from being articulated before the others, are distinguished by the title of *anterior*, the other having the title of *posterior*. In this animal the posterior cornua are united with the body into an arch, which has a tuberosity or enlargement in the middle of its inferior part; and the anterior cornua consist each of two pieces that are unequal in length, the short one having an articulation with the styloid process.

TRUNK.

This is usually distinguished into the spine, pelvis, and thorax, the first of which is the most usual part of the bony structure in all animals. The number of *cervical* vertibræ is mostly seven, in which the transverse processes form two angles, or double processes of that kind, and these vertebræ have all along their front a longitudinal ridge. They have that singularly elastic substance which is termed ligamentum nuchæ of very great strength, and firmly attached to them as well as to the dorsal vertebræ.

In the *dorsal* vertebræ, which in the cow kind are mostly about thirteen, the anterior spinous processes are enlarged in consequence of the weight of the head and length of the neck for the better and more secure attachment of the several muscles and ligamentum nuchæ.

In the *lumbar* vertebræ, which are usually six in these animals, the size of the transverse processes is very considerable, in order to afford full and perfect attachment to the strong muscles of the loins.

In the *sacral* vertebræ, which are commonly four, there is almost a continued crest formed, the whole making a sort of elongated triangle which is a continuation of the spine.

In the *caudal* vertebræ, which are generally sixteen, those which are situated next to the os sacrum have the same processes as those of the other portions of the spine, as well as the canal for containing the medulla spinalis; but those towards the extremity of the tail which diminish gradually in size to its end, want the last, and have only small processes or risings for the purpose of the insertion of the muscles in the place of the spinous and transverse processes. The tail, which consists of a great number of pieces, seems to be formed by the extension of the os coccygis*.

* The number of vertebræ in different parts of the spine, are in several other sorts of domestic animals as below.

	Cervical.	*Dorsal.*	*Lumbar.*	*Sacral.*	*Caudal.*
In the Horse . .	7	18	6	2	17
—— Ass . .	7	18	5	2	17
—— Mule . .	7	18	5-6	2	17
—— Hog . .	7	14	5	3	5 or more

In

In the *pelvis* of the cow there is proportionally less width and less of the bason form than in that of the human subject; but the ossa ilia are of great breadth, and have the external surface concave or hollowed. The anterior part of the ilium is very large, and the internal surface is turned towards the spine and the ischeatic notch, causes it to be very much hollowed.

The THORAX in these animals is usually somewhat compressed on the sides externally, having much depth from spine to sternum, but a full and well-rounded capacious form of such parts is greatly beneficial, as affording more room for the lungs, and other contained parts.

RIBS.

These are various in the number, in both the true and false kinds, in many animals, but in the cow they are mostly about thirteen, eight being true, and five false*. They are thick and broad in general, but more so when the beasts are employed in labour, with a greater degree of roundness; the strength of the spine and its power of sustaining great weights, depending very materially on the size of the ribs, and the form which they give to the trunk of the body. They commonly answer to the number of dorsal vertebræ on each side. The curvatures of them are but little, which render the chest more flattened or narrowed on the sides, particularly towards the sternum, which is long in proportion to the body, and projects somewhat forward.

EXTREMITIES.

These are the parts which afford the animals the means and power of moving about, and are divided, as has been seen, into the fore and hind ones.

ANTERIOR EXTREMITIES.

In the cow the *clavicle* is wanting, by means of which the fore extremities are allowed to come nearer towards each other, and their progressive motion thereby rendered more easy and expeditious. The sternum has a slight projection forward before the line of the first rib. The scapula is without either acromion, coracoid, or recurrent process, and the edge next the spine is short.

The *arm*, or os humeri, is single in each of the fore extremities, and comparatively short, but deeply seated in the fleshy parts of the chest. In the *fore arm*, the ulna is small, and forms a sort of appendage to the radius, which is the principal bone, being in almost its whole length anchylosed with it, so as to appear but one bone, or leave a short fissure only. The inferior head of it is compressed, and the back of the carpus turned somewhat

	Cervical.	*Dorsal.*	*Lumbar.*	*Sacral.*	*Caudal.*
In the Deer . .	7	13	6	3	11
—— Goat . .	7	13	6	4	12
—— Sheep . .	7	13	6	4	16
—— Rabbit . .	7	12	7	2	20
—— Dog . .	7	13	6	3	22

* The number in several different animals of the domestic kind are these:

	Number.	*True.*	*False.*
In the Horse . .	18	8	10
—— Deer . .	13	8	5
—— Hog . .	14	7	7
—— Rabbit . .	12	7	5

forward. The two metacarpal bones become at an early period united into one piece, which is termed the cannon or shank-bone. The metacarpus forms what is usually called the fore-leg, the carpus having the name of the knee. It is this bone which supports the two toes that form the part which has the name of *cloven* foot.

POSTERIOR EXTREMITIES.

In the cow, the os femoris, as that of the humerus, is single, being short in proportion to the size of the animal, and has itself so much enveloped in the flesh of the buttock, that the portion which is in reality the leg, is not unusually termed the thigh. It is ordinarily called the round of beef-bone. The neck of the bone is short, but the great trochanter rises somewhat above the head of it. The tibia is longer than the os femoris. The fibula is wholly wanting; the small bone which is situated on the external edge of the astragalus, and which forms the external malleolus affords the only vestige of it.

The tarsal and metatarsal bones are somewhat similar to those in the fore-arm; but the scaphoid and cuboid bones are united in one. The small bone on the outside of the astragalus is articulated with the os calcis, and takes the place of the fibula, and is similar to one in the fore-foot, as supplying the ulna. The structure of the metatarsal bone is similar to that of the metacarpal one, and in the cow it is single and forms the canon bone of the hind-leg, which has sometimes a small styloid bone on the different sides, which are the rudiments of the metatarsal bones and phalanges of some of the toes, agreeing much in their structure with the same parts in the fore extremities. In the cow kind of animals, there are two perfect toes, and two small ones, which are attached to the under part of a metatarsal bone.

In the subjoined plate, fig. 1. shews the head, with the increasing size of the cheek-bone upwards, and the form of the lower jaw, with the nature of its condyloid attachment to admit of free motion. Fig. 2. displays the seven cervical vertebræ, with their transverse processes. Fig. 3. the different dorsal vertebræ, with their enlarged anterior spinous processes. Fig. 4. the six lumbar vertebræ and their transverse processes for the attachment of the muscles. Fig. 5. the four sacral vertebræ and their elongated crest and processes. Fig. 6. the sixteen caudal vertebræ, with their processes. Fig. 7. the os ilium, which forms the sides of the pelvis. Figs. 8, 9, 10, 11, 12, 13, are the six ribs which form the thorax and brisket. Figs. 14, 15, 16, 17, 18, 19, 20, are the seven hind ribs which form the body part. Fig. 21. shews the form of the shoulder bone, and the nature of its attachment to the breast part of the animal. Fig. 22. is the humerus or arm bone, which is single, and the nature of its articulations above and below seen. Fig. 23. displays the fore-arm, the front part of which is usually termed the shin, with the compressed inferior head of it, and the back part of the carpus turned forward. Fig. 24. is the metacarpal bone, or what is commonly called the fore-leg, the carpus forming what is termed the knee. Fig. 25. shews the same as it supports the two toes which form the hoof.

In the hinder extremities also the os femoris is single, and is seen with its different articulations at fig. 26, being the bone which supports the round of beef. Fig. 27. is the leg-bone, which is not unfrequently mistaken for the thigh; at fig. 28. is displayed the metatarsal bone, which is single, and similar in its

formation to that of the metacarpal. Fig. 29. shews the different toes of the hoof.

In this manner the several parts of the skeleton in the cow are formed and made up, so as to act harmoniously, and in the best way upon each other for the nature of the habits and economy of the animal.

Section 2.—*Muscles.*

These, as the moving powers in the cow kind of animals, are less finely and strongly formed than in the horse; but it is necessary that they be full and fleshy, in order to give that roundness and meatiness in different parts which is so essential in beasts which are destined as the food of man.

MUSCLES OF THE HEAD AND FACE.

The muscles of these parts are almost wholly such as arise from the nature and uses of the several organs in the animal. The occipita frontalis is without its usual thickness in the cow, as being but little necessary. But in the *lips* there are muscles which are large and distinct on account of the varied extensive action of them in performing the process of masticating their food, as those which elevate, depress, and give them a sort of rotary motion.

In the *nose* there are two on each side, which arise from the inferior part of the os maxillare superioris, just above the anterior molar teeth, two of them being superior, and two inferior; the first sending off each two tendons, one to the upper edge, and the other to the posterior angle of the nostril. They divide each into three portions; and are all inserted into the inferior edge of the nostril. There is besides these a muscle for depressing the nose.

The muscles of the *mouth* in these animals have somewhat the form of the parts which compose it; as the levator and depressor labii superioris, the pyramidalis, which takes its rise from the fore part of the superior maxillary bone, and is attached to the sides of the nose and corner of the mouth; the maxillaris from the fore head, which is similarly attached in its two divided oblique slips; the zygomatic; the buccinator; the depressor labii inferioris, orbicularis oris, and some others.

In the *lower jaw* there is a thick strong masseter muscle proportioned to the force required in closing the jaws in eating; and the diagastric muscle has the middle portion covered above on the internal edge by an aponeurosis, which gives attachment to a square muscle which extends from one diagastric to the other. The pterygoid and masseter muscles are large in these animals, especially the latter.

MUSCLES OF THE EYE AND EAR.

In the *eye* of the cow there is a peculiar muscle named suspensorius, designed probably from the direction of the fibres of it to assist the others. It comes, as the straight muscles, from the edge of the foramen opticum, and passing between these and the ball of the eye, is fastened to the sclerotis, a little behind the insertion of the muscles termed recti, and is somewhat in the funnel form. It is often called the retractor of the eye. The oblique muscles of the ball of the eye have little difference from those in the human subject, but the straight muscles are more in number and stronger.

In the *ear* there are many different muscles which contribute to its external motion, as those which come from the head and neck to be inserted into some cartilaginous part of the ear, and which draw the ear upwards and inwards; forwards and somewhat upwards; and in some other directions; as the cervico-auricularis which arises from the cervical ligament,

and becomes inserted on the conca, pulling it backwards and to the contrary side; the occipito-auricularis, which passes from the occiput to the conca, and draws it upwards and backwards; the cervico-tubalis profundus, that proceeds from the cervical ligament to the tube of the ear, and draws it backwards; the occipito-auricularis rotator, that arises from the occiput, and terminates near the tube of the conca, drawing the ear round; the parotida-auricularis, that comes from the gland of that name to the conca near the tragus, and which depresses the ear; the jugo-auricularis, that proceeds from the zygoma to the conca, and is large; and the jugo-auricularis profundus, that comes from the hind part of the zygoma, and is inserted into the conca near the tube, which shortens it.

By means of these different muscles, the animals are capable of giving various positions to the external ear, and of collecting sounds which are differently conveyed to them.

MUSCLES ON AND NEAR THE NECK AND THROAT.

In the cow the place of the platysma myoides is principally supplied by the thin fleshy expansion termed panniculus carnosus, noticed below. The sterno-mastoideus is variously connected with the trapezius and deltoideus; and the sterno-hyoid and thyroid muscles usually arise from the cartilaginous extremity of the first rib with which they are firmly united. The stylo-hyoideus is without perforation by other muscles in this animal. The stylo-mastoideus is a small muscle that arises from the external surface of the mastoid process, and is inserted upon the internal surface of the temporal end of the styloid bone, serving to raise it outwards and upwards. The other muscles that have a connexion with the os-hyoides have in some measure the shape of the bone given them.

The muscles of the *larynx* and *pharynx* have much similarity to those in the human subject; but are larger and have a slight variation in consequence of the different form of the cartilages and their different cavities. The hyo-epiglottideus is somewhat cylindrical in its form, arising by two portions from the base of the anterior cornua of the os hyoides, and becoming inserted into the middle part of the epiglottis, which it serves to raise from the glottis. There is a pharyngeus and a stylo-pharyngeus, the latter of which, from the nature of the position of the pharynx, has some peculiarity in its direction and the effect which it produces. It takes an almost perpendicular descent from the styloid process, or bone on the upper surface or sides of the pharynx, and it is not before it has passed under the constrictor muscle that it turns and proceeds backwards along the pharynx. It has the power rather of dilating the opening of the pharynx than that of bringing it forwards.

The muscles of the *tongue* are pretty much the same as those in the human subject, but they have more length, thickness, and strength, for the effectual performing of their different actions in proportion to the size of the animal.

MUSCLES UNDER THE SKIN.

There is in the cow a thin fleshy muscular expansion that lies directly under the skin, which is termed panniculus carnosus. It covers part of the head, neck, and higher portion of the thighs, as well as much of the trunk of the body. The fibres of it unite underneath the axilla, where they are inserted by one or two tendons in connexion with that of the great pectoral muscle under the head part of the humerus. It acts in some degree upon the

anterior extremity, but is principally useful in giving different movements to the skin, by which much benefit is derived to the animal: by it, too, the hair, especially on the neck, is made to stand on end at its pleasure.

MUSCLES ON THE INFERIOR AND LATERAL PARTS OF THE THORAX AND ABDOMEN.

In the former of these parts, the pectoralis major, in the cow, is a large muscle, which is divided into several portions, so as to have the appearance of many distinct muscles. The pectoralis minor and subclavius are wanting in animals of this kind; but the serratus magnus is extensive, as being attached not merely to the ribs, but to the transverse processes of the cervical vertebræ.

In the *latter* of these parts, the muscles are large and narrow, partly from the shape of the trunk, but not wholly, as the recti and pyramidales are commonly the most lengthened. They are very extensively and firmly attached in both their origins and insertions, for the purpose not only of affording complete support to the abdominal contents, but for giving the suitable pressure to them.

MUSCLES SITUATED BETWEEN THE RIBS, AND WITHIN THE CAVITIES OF THE THORAX AND ABDOMEN.

There are in the intercostales and sterno-costales muscles of this animal, more size and strength in proportion than in the human subject; particularly in the latter, which may, in consequence, have a more powerful action upon the ribs, and give more pressure and support. The muscles that run on and line the inside of the thorax have, considerable thickness and strength, so as to impart the necessary force and assistance to the parts.

In the fleshy part of the diaphragm, there is great breadth, and extensive motion, it being rather loosely attached to the pericardium. The quadratus lumborum, the psoae, and the iliacus internus, are muscles which are constantly met with in the cow, in proportion to the number of the lumbar vertebræ, and the extent of the bone of the ilium.

MUSCLES ON THE INFERIOR PART OF THE VERTEBRÆ OF THE NECK, THE UPPER PART OF THE SPINE OF THE TRUNK, AND THE SEVERAL PARTS OF THE TAIL.

From the great size of the first two vertebræ of the neck, the obliquus capitis inferior, as well as the rectus capitis posticus major, muscles, are large in the cow with strong attachments. The biventer cervicis, or trachelo-dorsalis, is without a tendinous division into two bellies, and lies upon the complexus, but is distinct from it. The spleneus colli is large, and strongly inserted in these animals.

In the dorsal parts of the spine, the muscles have numerous attachments, which depend on the nature and extent of the vertebræ, but they conform pretty exactly, in their nature and insertion, to those in the human subject.

In the several divisions of the tail, the muscles are large, and variously formed, to suit the different movements of it. The sacro-coccygei superiores, or lumbo-supra-caudalis, of which there are different muscles, arise by a sort of fleshy fillets from the three first lumbar vertebræ, of the sacrum, as well as from the processes of the caudal vertebræ, having tendons passing off from them which are inserted into the base of the beginning vertebræ of the latter kind in succession, being confined in a kind of sheath. They serve the purpose of instantly erecting the tail. The interspinales, or lumbo-sacro-coccygei muscles, are those of the back interspinal ones continued. They act with the above in raising the tail. The muscles which are useful in depressing the tail, are the ilio-coccygei, or subcaudales, that

arise from the inner part of the ilium, spread on the pelvis, and are inserted into the acute angle-shaped bones of the under part of the tail. The sacro-sub-caudales, or coccygei inferiores, which are similar to those above it, only being situated on the opposite side of the tail: they come from the sacrum and the transverse processes of the higher caudal vertebræ, and their encased tendons are inserted at about the seventh caudal vertebræ. These different muscles, together with the superior coccygeal, act upon the tail to its very extremity, having directly the contrary powers and effects of each other, being useful in all the more nice movements of that part.

The subcaudales, or inter-coccygei muscles, which are situated on the middle under the tail, arise at the articulation of the first and following caudal vertebræ, and are primarily inserted into the acute angle-shaped bone of the fourth and two following vertebræ, and proceed, with their additions, to be further inserted into the base of each bone of the tail.

The pubo-subcaudalus, or coccygei muscles, have their origins broad and thin from the upper part of the pelvis, and go on to terminate in points, which are inserted into the processes at the base of the fourth and following vertebræ on the under surface of the tail, bringing that member close to the body.

The lateral motions of the tail are produced by muscles on the different sides of it. The ischio-caudalis, or ischio-coccygeus externus, arises from the inner surface of the ischium, and passes in a backward direction over the transverse processes of the tail, to be inserted into the vertebræ of it. And the inter-transversalis muscle passes from one of the different transverse processes to the other on each side, as far as they are formed.

MUSCLES OF THE ANTERIOR EXTREMITIES.

In the muscles of the *shoulder* and *upper arm* of the cow, there are several circumstances to be regarded. The pectoralis major, and serratus magnus, have been already noticed; but the former is very fleshy, and divided into different portions, that part which arises from the sternum being inserted into the linea aspera, which, with the portion on the contrary side, forms a common muscle for both arms, to which the name of ambibrachialis communis has been given, which has the effect of crossing the fore legs. The latissimus dorsi, the super and infra spinatus, subscapularis, and the teres major and minor, are formed and proportioned to the state of the scapula. The caraco-brachialis has its origin in this animal from the upper edge of the scapula. The supraspinatus is a large muscle in this kind of animal. The deltoides muscle has only the scapular portion in these animals, the other part being continued into the trapazius, and the scapular portion is distinguished into the acromial and infra spinal parts.

In the *fore arm*, the muscle that serves the purpose of the biceps has but one head, and is unconnected with the coraco brachialis. In common, the extensor muscles in these animals are not very simple, but of great strength, in order to the purposes which are requisite in their progressive movements. The supinator, as well as the pronator muscles, are wholly wanting in the cow.

The extensor carpi radialis, or external radialis, is inserted anteriorly into the base of the cannon bone, by which it is extended; and the flexor carpi radialis is inserted into the back part of the base of the same, and the flexor ulnaris and extensor ulnaris are inserted, and fixed in the bone that answers to that of the pisiforme; the three last serving the purpose

of flexion in this sort of animal. The extensor communis digitorum, in the cow has but two tendons, which are inserted into the two claws; the extensor proprius passing to the outer toe, and the extensor indicis to the inner. The extensor indicis proprius is wholly wanting. The extensor ossis metacarpi pollicis is fastened to the base of the metacarpal bone, and constitutes the oblique extensor of the cannon bone. The different extensor internodii muscles are not met with in these animals; but the flexor sublimis and flexor profundus send each of them two tendons to the toes.

MUSCLES OF THE POSTERIOR EXTREMITIES.

In the *thigh*, the different gluteii muscles are large and strongly inserted, giving considerable fulness to the parts, as well as by that of the gracilis, which is also very large in these animals. The iliacus internus and psoas magnus muscles have much length, so as to suit the great length of the pelvis. Most of the other muscles of this part are somewhat similar to those in the human subject.

In the *leg*, the short head of the muscle that has a similarity to the biceps is wanting, but the single head of it covers not merely a great part of the outer side of the thigh, and becomes inserted into the fibula, but supplies fibres to the whole length of the fascia lata, and performs the office of an extensor to the thigh. The semi-membranosus and semi-tendinosus muscles have their insertions so low down in the tibia, as to keep the limb in a state of semi-flection, which has in some measure the effect of preventing the animals from walking in an erect position.

In the *leg* and *foot*, the gastrocnemius muscle is constant, but with the soleus small and slender. The tibialis anticus is inserted into the base of the cannon bone. The tibialis posticus is wanting. The peroneus longus crosses over the joint of the cannon bone, to be inserted into the first os cuneiforme; and the peroneus brevis is wholly wanting in such animals.

In the *hoofs* or *toes*, the extensor pollicis has its fleshy fibres arising from the cannon bone, which are inserted into the tendon of the extensor longus muscle, consequently supplying the place of the extensor digitorum brevis. There is likewise an extensor proprius muscle, similar to that of the pollicis. The flexor brevis is wanting, but its place is supplied by the plantaris, which has great strength; and there is a muscle somewhat analogous to the flexor longus pollicis, which has its tendon joined with that of the flexor profundus.

These are most of the principal muscles in the construction of the several parts of the cow, and by which the different actions and functions of that kind are performed in such animals.

SECTION 3.—*Common Surface Integuments.*

THESE are formed of layers, as in the human subject, the outermost of which is pretty uniform in its substance and texture, but somewhat dry and hard. The corpus mucosum, which is interposed between this and the true skin, is somewhat evenly spread out, but of only little thickness. The cutis, or true skin, is considerably various in animals of this sort, being in some kinds of a good thickness, while in others it is almost as thin as paper. The nervous papillæ of the skin are very similar to those in man, and the most distinct in such parts as are the most susceptible of touch. They are particularly distinct on the skin of the tongue in these animals.

The cellular substance has numerous little openings, which are in general filled with a

fatty matter, which is of a firm consistence, and forms tallow. The panniculus carnosus is situated below the common integuments, as noticed above.

These animals have hair to protect them from the effects of the weather, and as producing ornament. It is fixed in its growth in the true skin, and has a rounded form of the fibre, being frequently curled or wavy. Its colour is mostly somewhat similar to that of the corpus mucosum, residing underneath the cuticular covering, and not in the medullary part. The young are brought forth with the hair upon them. The hairs are similarly composed and constituted as in those of the human subject, and have a similarity of growth.

The heads of the animals, in some breeds or kinds, are furnished with horns, which are formed on processes of the frontal bone, and spring from the base in the early state of growth in the animal. The skin of the part, which by its protrusion forwards, in an after period, is to form the horn, first becomes in a callous state, and then gradually changes into horn. In the cow kind they are round, but in the sheep flat, and they form different curvatures as the kind may be. In the part between the process of bone and the horn that covers it, there is a soft vascular substance interposed, which, while it nourishes the outer surface part of the bone, produces the horn in successive laminæ, which are sent off upon the internal surface. And as the animal advances in age furrows are formed, which extend across the root part of the horn, from which, by careful attention and experience, the length of time the beast has lived can be pretty nearly known. The colour of the horns, as in the hair, depends on that of the corpus mucosum. In their texture they are solid, insensible, and of a fibrous nature, having much analogy to the hairs. When thin, they are transparent, and become soft by means of hot water, or any such fluid*.

These animals have the toes enclosed in a sort of triangular hooves, which constitute a kind of mould, on which they tread and travel. They are of a similar nature, and formed in much the same manner as the horns. They proceed in their growth from the base or upper part, to which the integuments are attached. They have usually their beginning form before the animal is brought forth; and their colour, as in the horns, depends upon that of the corpus mucosum. They protect the toes from injuries of different kinds. In the cleft of the hooves of the cow, sometimes, and especially in that of the sheep, there is a glandular cavity, lined with hair, that sends out an excretory duct, which opens at the point, where the two hooves unite. In cases where this becomes

* It may be noticed, that the antler of the *deer* and *stag* is different from horn, in increasing from its extremity, and not from the base of it, in having it covered at a certain time with hairs, and in being deciduous. It is a true bony process, seeming to be, when perfectly grown, a continuation of the os frontis, being covered in the period of its growth by a periosteum and a hairy skin, which is highly vascular; the vessels protruding through a sort of osseous circle at the bottom part of the antler. It is usually completed in its growth before the termination of the third month. And when it has become perfectly formed, the coat of periosteum, and skin is lost, on account of the vessels at the root part becoming obstructed, remaining afterwards quite bare; and no distinction can now be noticed, but merely a sort of irregular projecting circle at the bottom part of it. On its dropping from the head, the integumental parts close over the bony portion with which it was connected, until the time of its renewal again arrives, when a process is projected that forms the succeeding antler, which is constantly found to be of greater length than that which has preceded it. It is noticeable, too, that the branches of the carotid artery, which furnish this substance, are enlarged during its growth, but return to their usual state when it has attained its full growth and perfection.

obstructed, in consequence of dampness from wet seasons, it is often the cause of disease, especially in the latter of the animals.

SECTION 4.—*Internal Parts, and the different Viscera of the Thoracic and abdominal Cavities.*

THERE are many circumstances and matters of importance to be regarded, in considering these several parts as being concerned in the exercise of the vital functions in the animals.

MOUTH AND THROAT, OR PARTS EMPLOYED IN MASTICATING AND SWALLOWING THE FOOD.

In the cow kind of animals, the opening of the mouth is large, in consequence of the division of the lips on each side being much extended backwards, having the cavity long, but of little breadth, owing to the form of the jaws. The inside of the mouth is spread over by a thick cuticular covering; and the roof and sides of it are lined with flat and pointed processes, which have the direction backwards, in order, probably, to facilitate the passage of the food through it.

TEETH.

These are such as are employed in the simple division and reduction of the food by chewing or grinding, and are of the incisive and molar kinds. The former, or incisive teeth, are confined to the front of the under jaw, there being no teeth in that part of the upper, their place being supplied by a hard cartilaginous state of the parts. These incisive teeth are found to be composed of a proper osseous substance in the base and an enamel, but it is not well ascertained, that there is any portion of the crusta petrosa entering into their composition. These teeth have a sort of wedge-like form, and there is a slight depression or dent in their cutting surface, into which the enamel is continued, and to which the crusta petrosa, if it really exist in them, may give a very thin covering*.

The *molar*, or grinding, teeth, which are situated in the back part of the mouth, as gaining thereby the benefit of the lateral motion of the jaws, the better supply of saliva, and the more full assistance of the tongue and cheeks, in turning the food while undergoing the process of reduction. These teeth are found to be formed of the osseous material, the enamel, and the crusta petrosa, the two latter of which substances, in the cow, are deposited in the interior of them in such a manner as to produce on the grinding surface, or on a transverse section, the appearance of a sort of crescents, leaving in the centre a small space, which is commonly kept full of the animal's masticated food. It has been supposed, by some, that the portions of this impacted food into the hollows of these teeth supply the place of the crusta petrosa, and contribute to form the masticating surface, but others have not considered it hard enough to answer such purpose, and have conceived the cavity that holds it to be constantly covered by a layer of the crusta petrosa. In these animals there is mostly, or, probably, always, a greater or less portion of the crusta petrosa deposited around the bodies of the molares, as well as in their interior. When the teeth are but little worn, the higher parts appear uncovered and display the enamel, the crusta seeming only to have filled up the inequalities upon the surface

* In the *horse*, the front teeth, however, seem to be originally covered with this substance; and some of it certainly remains in the cavity of the cutting edge, and upon the sides, as well as the fangs of them, during the life of the animal; but though the *crusta petrosa* has been discovered to pass into the hollow of the teeth, and give a covering to the enamel, the front teeth in the animal gradually wear down, until such hollows become obliterated and done away.

parts*. The surfaces of the grinding teeth in these animals are somewhat oblique, the outer margin of the upper ones and the inner margin of the under ones being constantly the most prominent.

The consideration of the nature and formation of the teeth in these large quadrupeds, have thrown much light on the organization and growth of teeth generally. That very tender vascular substance which secretes the rudiment or nucleus of the tooth, and on which it continues to grow, has, in the teeth of the human subject, been popularly termed the *nerve*, in consequence of its being supposed a prolongation of the dental branches of the nerves named maxillary. In such large teeth the pulp or soft matter is seen without difficulty to be formed of a spongy material, which is peculiar in its quality, having, in the young animal, nearly the softness of jelly; the blood-vessels of which are extremely numerous and minute; as well as probably the nerves, as there is no large branch of the dental found to be contained in the pulpy matter. It would seem, indeed, that the structure of the pulps of the teeth, have much similarity to that of the pulpy matters of hairs, feathers, horns, and other such substances.

In these cases, where the enamel passes down into the substance of the teeth, there are different processes of the pulp that produce an equal number of osseous shells, or moulds, that are termed denticuli. This osseous part is very hard and compact, especially in the molar teeth. There is a perceptible difference, too, between the composition of the external and internal portions of the osseous moulds of these teeth. The primary deposits of the pulp are very hard, with longitudinal streaks of a yellow greenish cast, and semi-transparent, as in the topaz. The parts afterwards deposited by the pulp are more dark in colour, and of the usual appearance of bone, displaying but little signs of laminæ. In structure, they come very nearly to that of the fang, which, being the latest formed, commonly resembles bone. It is evident, from the streaked appearance just noticed, that the osseous moulds are secreted in layers by the pulp. This growth by layers, in this part of the tooth, has also been proved experimentally, by feeding a young animal with madder, at the time the teeth were forming.

The structure of the enamel, too, is clearly seen in these cases. The peculiar arrangement of its fibres is very strongly marked, as diverging from a centre, in the making of a section of a large molar tooth, in which the enamel extends farther than the surface. The striæ are, in such cases, intermixed at their extremities with the crusta petrosa, and give an appearance not much unlike the barbs on the feather. These fibres are not always formed in a rectilinear manner, but more often in a sort of curve, the convexity of which is turned towards the crown of the tooth. It has long been known,

* There are different appearances of the cutting and reducing surface of the teeth in different animals of the domestic kind. In the *sheep* there is not any apparent crusta upon the outside of the tooth after it has been used; but it is not unlikely, from the analogy of structure, that when the grinders of the animal first come out from the gums, they have a thin covering of crusta petrosa on them.

In the *horse*, the grinding surface of the molar teeth exhibits a zig-zag, or undulating line, formed by the osseous substance of the tooth and enamel encased in the crusta petrosa. The cavities, or holes in the teeth of this animal, are a great deal smaller than in those of the cow kind. It has been thought, that they originally afforded passage to a blood-vessel, but in the horse, as well as the cow, the holes in the teeth were then taken up by the processes of the capsule that secreted the crusta petrosa.

that the enamel is a production of the capsules of the teeth, but it is yet uncertain whether it be a secretion directly produced by the capsule itself, or a fluid, in a peculiar state for the purpose, contained in it. In respect to the composition of the enamel, there is also an equal uncertainty, as its chemical nature is far from being fully proved by the trials which have yet been made.

The last substance which enters into the composition of the teeth is peculiar to these and some other such animals, and not found in the human subject. It has been appropriately called, crusta petrosa, by Blake, but others have termed it the osseous, or bony portion, and some cement, either in consequence of its more near approach to perfect bone than the other parts of the teeth, or on account of its consolidating into one the different denticuli of the grinding teeth in these and some other animals. It is a substance of a pale yellow colour, uniform in its texture, but displaying neither fibres nor layers; it is more solid, dense, and heavy, but less hard, friable, and elastic, than the other parts of the teeth; resembling more the callous or osseous matter thrown out in consequence of inflammation, than any other material in the animal body. It is constantly found deposited in the interstices or depressions of the teeth; and it is only after these are filled that it appears to impart a covering to the more raised parts. The superfices of this substance are never smooth or regular until it be worn by mastication; and on some parts of the teeth, especially about the roots, it affords the appearance of congealed drops of a fluid matter, which had been in the state of fusion. It has been supposed, by Tenon, to be produced by the ossification of the membrane that had encased the teeth; and by Blake, to arise from the surface of the membrane which is opposite to that which secretes the enamel; but Cuvier has, with more propriety, stated it to be formed by the internal membrane of the capsule, after it has deposited the enamel, undergoing a change of structure, and becoming thick, spongy, opaque, and more vascular: that it is shed, as it were, in drops, which form irregularly upon the surfaces of the teeth. When the internal membrane of the capsule is prolonged into processes that pass into the interspaces of the compound teeth of these large animals, they become similarly changed, after depositing the enamel in such situations, and then secrete the crusta, which serves to unite the denticuli in one tooth.

As the crusta petrosa wears down faster than either the osseous mould or the enamel of the teeth, it becomes very useful in this sort of animals; the two first constantly presenting upon the grinding surface of the teeth certain eminences, which act in the division of the food in the same manner as the irregular risings and points on mill-stones or other such reducing bodies.

This is the softest of the three component parts of the tooth, and is, of course, more readily affected by acids and fire than the osseous material. It is, occasionally, incompletely formed in the centre of the tooth in the cow, on account of which cavities are left which become filled with extraneous matters*.

* The enamel, in the centre of the incisor teeth of the *horse*, is thought to have no *crusta petrosa*, but to be filled with a blackish tartar that extends but a short way into the tooth; consequently, soon disappears by means of mastication, and is termed the filling up of the teeth, or more usually the *mark* in the mouth, as forming a sort of criterion of the age of the animal.

SUCCESSIONAL CHANGES IN THE TEETH.

In the cow there are three milk molar teeth, which are replaced by three other new ones and three permanent unchangeable ones. The former are distinguished from the latter set, by having more length from before backward than in the transverse direction. The front teeth are replaced by larger ones at an early age of the animal, and when these and the grinders have all come forth, they continue during the life-time of the beast*.

TONGUE.

This long, narrow, fleshy, and flexible member in the cow is covered with a firm cuticle, which has innumerable sharp-pointed papillæ formed upon it, and turned backwards towards the throat. These, in the manner of so many hooked bodies, give assistance in laying hold of the grassy and other kinds of food, while, at the same time, they answer the purpose of increasing the power of taste in the animal. The papillæ conicæ that are cast over the fore part of the tongue, end each in a sort of horny flexible filament, which is turned towards the throat, being useful in the above manner. The hind or posterior part of this organ is set over with tuberculated papillæ which are often numerous. Thus armed with its other means, the tongue in these animals becomes a very powerful and active member for the purposes of manducation, as while the food is taken in with more certainty and readiness, its muscles give it the power of moving it in every possible direction, and consequently of conveying it from any one part of the mouth

* In the *horse*, the changes of the teeth have been more attended to, and are stated to be these, that the milk incisors make their appearance about the beginning of the third week after the foal has been brought forth. The four middle of these teeth, which are known by the title of *pincers*, fall out in the thirtieth month; the following four in the forty-second; and the four external or corner teeth, in the fifty-fourth month. The permanent corner teeth do not grow so soon as the other incisor teeth; and when they first appear they scarcely project beyond the jaw part in which they are placed.

The depression or hollow in the middle of the incisor teeth, which is filled with blackish tartar, is worn off by use between the fourth and the eighth year, after which it is wholly wanting. But in the corner teeth it continues longer, on account of which the age of the animal can mostly be known with much accuracy. However, after this time, the age can only be judged of by the length of the incisors, which are in a constant state of growth.

In regard to the molares, the two first in each jaw appear about the end of the first week, the next towards the end of the third, and the small anterior ones between the fifth and sixth week.

The first of the back molares shew themselves towards the end of the first year, the next near that of the second. And between the second and third year, the first milk molares fall out, the third drops in three years; and towards the fifth or sixth year the last molaris makes its appearance. The temporary molares are distinguished by being longer from before backwards than the permanent set.

In the *sheep*, the age is ascertained and known by the throwing up and replacing of the incisor teeth. See the heads *Teething* in *Neat Cattle*, *Sheep*, and the *Horse*, &c.

Number of Teeth on each Side of the Jaw in several different Domestic Animals.

ANIMALS.	*Superior Incisores.*	*Inferior Incisores.*	*Superior Molares.*	*Inferior Molares.*	*Superior Canini.*	*Inferior Canini.*
Neat Cattle	0	4	6	6	0	0
Deer	0	4	6	6	0	0
Hog	3	3	7	7	1	1
Rabbit	1	1	5	5		
Dog	3	3	6	6	1	1

to another, as well as of putting the unreduced parts of it between the grinding teeth, to be retained there until it be sufficiently broken and divided, so as to be carried by its assistance into the pharyngal cavity to be swallowed*.

SALIVARY GLANDS.

These, in animals of the cow kind, are very large, especially those which are situated posteriorly in regard to the mouth. There is a cluster of glands situated in these beasts, as well as in sheep, in the zygomatic fossa, which extends as high as the ball of the eye, and descends lower than the zygoma underneath the masseter muscle. The ducts of these parotid glands pass by the inferior portion of the masseter, and perforate the cheek opposite to the second and third upper molar teeth.

The maxillary gland is here particularly long, extending, as in the horse, along the larynx and pharynx, having at its termination a papillary valve. The sublingual gland is likewise of much length, and has only a single duct, which runs on the side of the lower maxillary, opening upon a papilla, towards the termination of the last. There is a ductus incisivus, too, which is double, and forms a communication between the mouth and the different nostrils, by means of which fluids pass from one cavity to the other†.

LARYNGAL AND PHARYNGAL PARTS.

In these there is nothing to be particularly noticed, only that they are large and of considerable strength; and that the uvula is wanting, as there is no sort of prolongation sent off from the velum palati of that kind. But though the larynx in the cow is simple, there is a sort of glottis and epiglottis, and the arytenoid cartilages are curved back, forming more than half of the former of these parts. The inner surfaces of them touch each other; but there are neither anterior ligaments or ventricles present in this animal or in the sheep‡.

* Under the tongue of the dog there is a peculiar cord-like tendinous fasciculus, which is generally known by the title of *worm*. It is placed below on the substance of that member extending to the fore part of it, and is enclosed in a sort of membranous sheath, but without having any muscular connexion as in other cases of tendons. It has been supposed by some to be useful in the animal in taking the liquid food by lapping it. Some dangerous and ill-founded notions have very long prevailed regarding it, as that by removing it from the tongue of the animal, it will in future be prevented from becoming mad; and that dogs which have been *wormed*, in case they should be attacked by hydrophobia, will not have any disposition to bite. This kind of error and credulity has been productive of the worst and most mischievous consequences, by preventing or thwarting the use of the only real and certain means of cure in so dreadful a disease.

† In the *horse*, the *zygomatic glands* are the continuation of the molar ones, which ascend behind the upper jaw to near the abductor muscle of the eye. The parotids too are very large in this animal, and pass upwards behind the external ear, and downwards as far as the angle of the jaw.

In the *hog*, there are two sublingual glands on each side, one before the other; the hinder, which is narrow and of much length, is situated on the outer side of the maxillary one, extending from the angle of the jaw to the anterior sublingual, and sending out a single duct that terminates at a short distance from the end of the maxillary duct. The anterior one perforates the mouth by different openings in a sort of range.

‡ In the *horse*, there are neither ligaments of the glottis nor ventricles strictly so termed; but a sort of falciform membrane which is attached by its middle part to the thyroid cartilage, while its extremities run along the external edge of the rima glottidis, which is a kind of structure in this animal that has been thought to be the cause of neighing in it. The vocal ligaments have before them a large passage in each side, somewhat in the form of a ventricle, that lead to a large sac, the greatest part of which is covered by the thyroid and aryteroid muscles; and behind the base of the epiglottis there is a foramen or hole that leads to a cavity, which is under the anterior edge of the thyroid cartilage, but which has no communication with the lateral sacs. In

ESOPHAGUS, OR THROAT.

This tube for the passage of the food is, in a great measure, cylindrical in the cow, and is the part extending from the pharynx to the stomach. It is of considerable length, and has its muscular coat formed of two distinct layers, the fibres of which have a sort of spiral direction; those of that which is external, taking one course, and those of the internal one another, which is directly the contrary, so that they constantly decussate or cross each other. This structure of these spiral muscular parts, has been supposed to be peculiar to the construction of the esophagus or throat of these animals which *ruminate* or chew the cud, and that it depended on it, though it has been long ago found to exist in that of those which do not possess this property; but in those of the former kind, the different layers are of greater strength and power. It has many plicæ or folds, formed on its inner surface, which are placed close to each other, two or three of them uniting to complete the circle of the gullet. There are also numerous little follicles that supply a mucous fluid in a plentiful manner for lubricating the passage.

This tube, in conveying matters into the stomach, in a direction contrary to their gravity, affords a very clear proof of the nature of its functions. Its action, as those of the intestines, is constantly peristaltic. These alternate contractions and dilatations of the different parts of the tube, are rendered evident when such long-necked animals are drinking; the water not passing in the manner of a stream down through the gullet, but in that of little globes, having the fibres of the muscles contracting behind them as they proceed onwards. The throat is consequently always comparatively in a sort of closed state, except at those particular parts of it where the portions of food or drink are contained.

The esophagus, in the cow, has its entrance into the stomach in a somewhat oblique or contracted manner; but it is different in many other animals*.

In the *ass*, too, there is the same kind of falciform membrane, and the same number of sacs or pouches, but the mouths of which are smaller; while the middle pouch in this animal is sensibly larger than in that, and is conceived to be the part from which the sound is supposed to come in the act of braying.

In the *mule*, whether produced from the *male ass* and the *mare*, or the *stallion* and the *she ass*, the larynx it seems is more similar to that of the mother; while the voice has rather the resemblance of that of the *ass*. In the *mule*, the anterior sac is larger than in the *ass*.

In particular *deer*, a passage is met with at the base of the epiglottis, which leads to a sac, which is situated between the epiglottis and the thyroid cartilage.

In the *pig*, there are two bags situated higher up or before the ligaments of the glottis, which are said to occasion the grunting in that animal.

* In the *horse*, the esophageal opening of the stomach is lessened by a projection of the coats, which has, in some degree, the appearance, and, it is believed, the effect, of a valve. It is commonly supposed, that this structure renders the animal incapable of vomiting. But horses have been known to vomit, on very powerful medicines of the emetic kind having been made use of. It is probably equally difficult to excite vomiting in the ruminant animal, notwithstanding it has the power at all times of bringing back into the mouth the matters contained in the stomach at pleasure. The manner in which the esophagus terminates in the stomach is not therefore sufficient to explain the indisposition to vomit in animals of this kind, some other is necessary. May it not, it has lately been ingeniously asked, be ascribed to those parts of the stomach which adjoin the gullet being less capable of the stimulant action of bodies, in consequence of being covered with cuticle? or is it not that medicines, that have an emetic operation upon the human subject, have a different action on these, as it is a well known fact that matters of this kind have different, nay, even opposite, effects upon different animals? The dog, for instance, is excited to vomit by the eating of some sorts of grass.

STOMACH.

This is an important organ in the cow, the nature and structure of which is very material to be well understood. The two openings of it, the cardia and pylorus, are less direct than in some other cases, being more close or nearer together, and leaving a sort of *cul de sac* on the different sides, by means of which, the food is longer detained from passing into the intestines.

In animals of this kind, there are four distinct cavities or bags, which may be said to form the stomach, or what are mostly called four stomachs, which together, fill up a considerable portion of the abdominal space. The *first* of which is termed the *paunch*, *magnus venter*, or great stomach. It takes up the left side of the above cavity, and in the adult state of the animal, is larger than all the other ones taken together, being irregularly globular in its form. Externally, it has two sacs or appendices, as just noticed. On being laid open, it is found to some slight extent divided into three hollows or cavities, by means of the two ridges, or projectings of its coats, that cross it in an oblique manner; the upper hollow containing the mouth or opening of the second stomach or part, which is of such dimensions, that the two first parts or stomachs should probably be considered as parts of the same cavity. The different reflections of the coats, which form the above ridges, contain, in addition to the muscular coat, some tendinous expansions; in consequence of which, the edges of the ridges are rather thick and rounded. The whole of the muscles of the paunch part are particularly firm and strong in their texture. The internal membraneous covering is of a brown colour, and set with numerous strong papillæ of different sizes, in most of the different parts. The borders of the ridges are smooth; and there is a thick cuticle lining the bag or paunch, which is capable of being detected by means of maceration, when it is shewn that it has given a covering to each of the papillæ. The matters contained in the paunch, are the vegetable substances taken in by the animal, imperfectly masticated, and unmixed with any of the prepared juices, or even the liquid that has been drank. It is, consequently, in this bag or paunch, that the fermentation of rich green food is liable to take place; many such cattle having their bodies very much distended in the time of this process going on in the paunch, by the extrication of air. The most ready and effectual means of remedying which, will be afterwards considered in speaking of the disease in this and other sorts of live stock.—*See Hoven.*

It is commonly in the first bag or stomach, but rarely in the second, that the concretions of hair, or other such matters, are met with. These *hair-balls*, which are occasionally discovered in the paunch of the cow, are licked off from the body, and formed in this part, being curiously interwoven and felted together, and having in some cases a sort of earthy coating which takes on a high polish.

The *second* stomach or part has the name of *king's bonnet*, *honey-comb-bag*, or *reticulum;* and if it were not for the nature of its internal structure, might be thought a globular appendage of the paunch part: it is seated on the right side of the esophageal canal, and somewhat anteriorly of the preceding stomach, with which it has a very free communication, as already shewn, having usually the muscular coat of it rather thicker and more soft than in that. The internal surface of it is raised into thin folds, which by joining to each other, produce a sort of many-sided meshes, or regular pentagonal superficial cells, which are

covered with fine papillæ. The sides of these folds are grooved, and the edges of them denticulated with finer risings. This stomach, or part, is lined by the continuation of the cuticle which covers the first. The opening of the esophagus takes place at the part where these two stomachs join, in such a manner as to be capable of communicating freely with the cavities of both, but the processes of swallowing and regurgitating the food, are very materially influenced by the agency of a sort of muscular groove or little gutter, which is continuous with the tube of the esophagus or gullet, and which at last leads into the third stomach or part. This groove, or gutter, is constituted and formed by means of two muscular sorts of risings, bands, or columns, which take their course from the sides of the opening of the esophagus. The right one extending the whole of the length of the higher surface of the king's hood, bonnet, or honey-comb stomach or part. The left takes its course within the edge of the opening from the first into the second stomach or part, and is lengthened out and continued upon the left surface of the latter of them. Each of these columns passes round the orifice that leads from the second into the third stomach or part, crossing upon the inside portion of it. The internal membraneous coating, where it covers these muscular risings or columns, is thick, and plaited regularly in a tranverse manner; while, on the contrary, it is very thin between them, and forms, in the concave part of the groove, some folds in a longitudinal direction. In this situation, there is, too, a layer of muscular fibres, which pass behind the groove, and connects one margin of it with the other. This gutter, or channel, forms the principal characteristic circumstance of the ruminant stomach. In the case where a portion of food is to be reconveyed to the mouth for further mastication, it is taken into the groove or gutter, which, by the contraction of its muscles, so approximates the two borders, that it forms, in some measure, a perfect tube, and in this way throws and transmits the morsel into the esophagus. When again, the act of rumination is finished, and the morsel swallowed, the groove becomes a tube, and conducts it directly into the third stomach or part.

At the time when the food and water are first received into the stomach, the sides of the groove or gutter are, of course, open; but, in all probability, the orifice of the third stomach or part, is, at the same instant, closed. And the different actions of this groove part are obviously at the constant command of the animal, which is very extraordinary, as it cannot be ascribed to, or explained on, any thing peculiar in the anatomical structure of the part. The nervous and vascular powers of it are the same as in other cases of animals of the quadruped kind. It has been stated, by an able and intelligent inquirer on this subject, that the food contained in the paunch part is constantly in a dry state, and that the water which is drank by the animal, passes into the second stomach or part, without being blended with the food in the first. It consequently appears, that the office of the king's hood, or honey-comb part, is to unite and mix in a gradual, suitable, convenient manner, the dry and liquid alimentary matters; in which intention, the first stomach or part is the place of reception for the meat, and the second for that of the drink.

The *third* stomach or part, which has long been indifferently denominated *omasum*, *many plies*, and *hedge-hog*, from the nature of its structure and appearance, is a cavity, stomach, or part, which lies to the right of the paunch, and

which in the cow is often larger than the last, being somewhat of a globular or rolled-up form, like the animal alluded to, with a less thick muscular coat than either of the two former. It is covered in its many plies or folds, as in the two former stomachs or parts, with a cuticle, and the muscular covering of it consists of different laminæ, arising from the internal one, and running in a longitudinal manner, but varying alternately in the breadth, being laid over with small granular papillæ. It has but a very contracted connexion with the second stomach or part. But the cavity of it is plentifully supplied, and furnished with thin folds or reflections of the coats of it, which originate from the smaller curvature; and some of the edges, at the large curvature, have a sort of similarity to that of the back of the hedge-hog. These different septa, or folds, are unequal in their dimensions. Sir E. Home has stated, that there are twenty-four of these septa, which are seven inches in breadth; somewhere about twenty-three that are four inches in breadth; and about forty-eight that are of one inch and a quarter in breadth; all of which are arranged somewhat in this manner and order; first a broad one, with one of the most narrow next it; after that a narrow one, with one of the most narrow next to it; then again a broad one; and so on in continuation. Whatever may pass into the cavity of this third stomach or part, must of necessity fall between these different septa, and be subject to perform the round of three-fourths of a circle, before it can reach the orifice of the fourth stomach or part, which is in such a near situation to the other, that the direct line of separation between them does not exceed the breadth of more than three inches.

The materials of the food kind that are met with in the third or many-plied stomach or part, are distributed among the different folds or septa, in a compressed or compacted state and manner. They have the consistence of a thickish sort of paste, and a smell, while in this part, which is particularly disagreeable and unpleasant.

The *fourth* stomach or part, commonly termed the *red* one, the *intestinal* one, or the *obomasum*, has a lengthened-out pyriform shape, and is the next in size to that of the paunch, measuring, in these animals, from Sir E. Home's account and description, about two feet nine inches in length: the internal membrane of it has eighteen longitudinal plicæ or rugæ, covered with villi, nine being situated on each side, beginning at the orifice or opening part of it, and extending about twenty-two inches into its cavity. They are of the breadth of four inches, and have the property of greatly increasing the internal surface of the part. In the portion beyond these, the inner coat forms some rugæ in a zig-zag or serpentine manner; and the cavity is slightly enlarged near to the pylorus, where there is placed a glandular body, that blocks up that opening when the parts are in the contracted state*. The muscular coat in this case, is still less thick than in that of the

* In the *deer*, the paunch part of the stomach has three pouches, or projections, seen externally, to which there are the same number of dilatations answering in the internal cavity. And in these animals, as well as in the *sheep*, the papillæ, and other risings or eminences of the inner coat of each of the several stomachs or parts are less elevated than they are in the cow kind of animals.

The *hog*, or *pig*, has a globularly-formed stomach; and the great bag, or *cul-de-sac* of it, has anteriorly an appendix, which gives a sort of double appearance to the organ. At the *pylorus*, too, there is a large sort of tubercle, which forms a kind of valve that is capable of retarding the passage of the food in its progress to the bowels.

third stomach or part. It is this stomach or part which in the young or fetal state of the calf, with the milk coagulated or curdled in it, that forms the *runnet* for the making of cheese and other substances of a similar kind: but the digestive stomachs of most animals have the power of producing this coagulation. In the three first stomachs, the inner surface is only covered by a fine sort of cuticle, while that of this would seem to be a membrane of the real mucous or other secreting kind.

The stomach, or stomachs, in this animal, is variously increased as it advances towards the state of maturity; as while it is young and fed upon milk, the fourth stomach is the largest, this fluid passing at once into that cavity, but very little, if any, going into the three others. But at the time when it begins to eat and take in solid food of the grass kind, it gains the power and faculty of *ruminating*. In the act of procuring such materials, it lays hold of them by pressing them with the tongue against the roof part of the mouth, and by the hard gums of the upper, and the teeth of the under, jaw, aided by a slight twist of the head, they are torn away; when, after a slight chewing, they are let down into the paunch, and from that they pass by small portions into the second stomach, from whence, when a quantity has been passed, they are gradually returned or thrown back into the mouth in small morsels, to be more fully and completely re-chewed, as already explained. The digestion is completed by the powers and agency of the third and fourth stomachs or parts.—See the head *Chewing the Cud.*

These are some of the principal facts and circumstances in regard to the nature and anatomical structure of the *compound*, or ruminant, stomach, in the cow; and those of the *simple* or non-ruminant stomach will be shown, in considering that part in speaking of the horse; the differences of which have been chiefly explained, and shown in contrast, in the account that has been given of chewing the cud, in the *plate* which is subjoined to that head.

INTESTINES.

The capacity of the alimentary canal in the cow is large, probably in consequence of the difficulty of assimilating the sort of materials used as food by the animal, as being that of the raw, fibrous, grassy, and ligneous vegetable kind. The length of the intestinal canal is not by any means decisive of the extent or power of the digestive means. This is to be constantly considered as it relates to the general width, the dilatation of its particular parts, and the extention of the inner surface by valves and folds. The state of complexity, and the degree of perfection, in the parts that are destined to perform the process of mastication, must, of necessity, influence the decisions that are to be deduced from the length of this canal in these animals.

The nature of their food causes this canal in these animals to be of great length; but it varies greatly in different sorts of domestic animals, being many times longer in some than in others*.

* If the length of the body be taken as 1, that of the intestines, in a straight line from the mouth to the anus, will have nearly the proportional length of the canal, as given below, in various sorts of animals that are of a domestic nature.

Names of Animals.	*Length of intestinal Canal.*
In the Ox	22
—— Sheep	23
—— Ram	28
—— Deer	12

The intestines in this sort of animals are distinguished into the small and the large or great ones, the former being the longest, and internally beset with villi: while the latter are more thick in their different coats, and but little, or not at all, furnished within with villi, which, in some measure, serves to mark the difference between the two portions of the canal. This last is, of course, unequal in its size, and there are distinct valvulæ conniventes formed in some parts of it. There are, too, in a great part of the intestines of these animals, a sort of concentric turns; and the duodenum is rather large, forming a sort of pouch; but the colon and cæcum have only a moderate degree of size or bulk, and are uniform on their surface parts, having nothing of the ligament kind tacking them up in the cell manner*. The latter of them would seem to be simply a prolongation of the beginning large intestines at the termination of the small ones; but is various as to size, form and structure, in different kinds of domestic and other sorts of animals. In the interior of the small intestines there are no folds, but only in the duodenum, where there are some transverse rugæ or plaits. The villi

Names of Animals.	*Length of intestinal Canal.*
In the Horse	10
—— Ass	9
—— Hog	16
—— Rabbit (wild)	11
———— (tame)	9
—— Dog	5

* These two latter parts of the intestines differ very materially in their size in different animals of the domestic kind.

In the *horse*, the size of the *cæcum*, as well as the *colon*, is remarkably large, having their length and width very considerable; while in some other animals the latter is not more than a few inches long, as seen below. It is on the size of these intestines that the remarkable swelled-out and distended appearance, which animals of this kind have, when matters of the hayey or strawey sort are only used as food, and have continued to accumulate in them, depends. The *colon* commences with a dilatation which is not much less in size than that of the *cæcum;* it is doubled upon itself; and in its course through the body, it forms other arches and curves. These great intestines are drawn up into a sort of sacks, which are the largest in the first portions of the *colon*. These will be more fully seen and explained in considering the internal structure and situation of these parts in the horse.

In the *goat*, there is a much larger *cæcum*, in proportion, than in the cow.

In the *hog*, both the *colon* and *cæcum* are of much the same size, the latter being tacked up into cells; and the small intestines are united, having papillæ which are very evident to the sight.

In the *rabbit*, the *colon* is somewhat dilated, being as wide as the *cæcum* at its origin, but it very soon contracts; it is at first formed into sacks by three longitudinal bands, and afterwards by one only. And the *cæcum* is longer than that of the whole animal, being internally furnished with a peculiar sort of spiral valve. It fills a considerable portion of the abdomen in the animal. It has a conical shape, and the contractions seen on the surface of it are regular. The small intestines are uniform in their size, villous, and have internally, in the ilium, some longitudinal folds. The coat of the *cæcum* internally is smooth, papillated in the first part of the *colon*, and rugous longitudinally in the *rectum*.

In the *dog*, the *colon*, which is furnished with a circular valve, is small and short, not being more than about eight or ten inches in length, in one of the middle size; without making any circuitous turns, it runs directly across the abdomen, in order to form the *rectum*. The *cæcum* makes some turns upon the ilium; these adhere to each other and to the sides of the small intestines, by the cellular matter, which causes the passage of any substance through it to be more difficult. The large intestines have some longitudinal folds; but the whole canal has nearly the same width. And the *duodenum*, which, at the *pylorus* is fixed to the liver, afterwards has a large portion of it hanging loose in the abdomen. In the inner side of the intestines there are valvulæ conniventes placed in a longitudinal direction.

are of the fine scaly kind in them. The cæcum is in the first part contracted, then dilated, and terminates in a sort of bulb. The inner coat of it is without rugæ, except only where it is narrow, and there some longitudinal rugæ are met with. The colon, too, is without folds in the inner coat. But the rectum has the coats of it more thick, and the internal surface has longitudinal folds, with some circular ones very near to the anus.

The number of the coats in the intestines of the cow is the same as those of the stomach, but they vary as to thickness and strength, and the muscular one has commonly more strength and power. The valvulæ conniventes, in the small intestines, are less evidently marked than in the human subject, but the villi more evidently and perfectly to be seen.

The intestines are constantly covered and supported by a peritoneal and mesenteric coat, which have the form, length, and direction, which is given to the bowels of the animal, so as to perfectly enwrap and protect them from injury, as well as to lubricate and cause them to slide easily and readily upon each other, as will hereafter be more fully seen and considered.

ANUS.

This is the extremity of the intestines, and is seated behind, just under the part where the tail takes its rise. It is a simple outlet, which gives passage to the dung and excrementitious matters, by being suitably furnished with muscles which act as a sphincter.

LIVER.

This is a viscus which has nearly the same proportional size in the cow, and much the same colour and intimate structure as in the human subject, having the last branches of the vena portæ terminating in a similar manner, and giving rise to the excretory ducts, but there are some parts which are wanting. The number of the lobes may be said to be two, but they are only little divided, so as to be somewhat in one piece, and without a ligamentum latum, the muscles of the abdomen affording them the necessary support. In other quadrupeds of the domestic kind, they are, however, more numerous*. The lobes of the liver, in consequence of being more distinct in this sort of animals, are less thick in their form, and have the edges more sharp than in the human subject, but which is a matter of little consequence, as they can have no sort of effect on the discharge of its functions. The situation of the liver in this animal is towards the right side of the cavity of the abdomen, which it fills up in a considerable degree, and gives a roundness to the animal's form in these parts.

GALL-BLADDER.

This is a small bag, or bladder, which, in the cow, is seated under the right lobe or part of

* The divisions in some different sorts are these:

Animals.	*Number of Lobes.*
In the Horse . . .	Two lobes, having only two notches.
——— Ram . . .	Three.
——— Goat . . .	Six.
——— Chamois . .	Three.
——— Hog . . .	Four.
——— Dog sort . .	Five to six.
——— Hare . . .	Three large and two small.
——— Rabbit . .	Nearly the same.

the liver, and which has a regular pyriform shape, as in the human subject. The principal circumstances to be attended to in the biliary system of the cow are, the nature and situation of the trunks of the hepatic ducts, and those of the manner of termination in the hepato-cystic ones. The former kind of these ducts, which run through the substance of the liver, unite into one trunk, which communicates with the latter, and which terminates directly in the body or neck of the gall-bag; the latter being different short ducts of a particular kind, which lead from the liver for the most part into the neck of the gall-bag, conveying the bile directly into it from that organ. In these cases, the hepato-cystic ducts are to be considered as supplying the place of the ductus communis choledochus. The ducts of the liver ultimately terminate in the duodenum, after piercing that part of the intestines in an oblique manner, much as in the human subject. The use of the hepatic ducts opening into the body or neck of the gall-bladder, is unquestionably to produce a more concentrated and perfect state of the bile by delaying its progress into the bowels; consequently, the presence of a gall-bag, whether the bile be conveyed directly into it, or by means of regurgitation, through the same duct that takes the bile out again, has necessarily the effect of increasing the particular properties of that fluid; as it is well ascertained that all secreted liquids, when increased and delayed in suitable reservoirs, are rendered more strong and powerful by their more watery parts being taken away by absorption. In this way that fluid becomes more fit for promoting the complete dissolution and digestion of the food in these animals*. The distance at which the bile is poured into the intestines, from that of the pylorus, does not seem to be a matter of much consequence to the digestion of the animal, as it is very different in those of the same kind.

PANCREAS.

In this glandular viscus, there are lobes, processes, and branches, which render its form somewhat different from that in the human subject; but in the colour and general structure it is much the same. The principal part of it in the cow is constantly seated in a transverse manner, somewhat behind the stomach, and between the spleen and the duodenum having something of the lozenge form. The duct of this gland, and that of the biliary one, have one common opening, being usually united at their termination; but both the form of the gland and the termination of the duct are different in animals of other kinds†. It has been suggested, that judging from the great variety which is to be noticed in regard to the manner

* In the *horse*, and most of that sort of animals which are without gall-bladders, the biliary or hepatic ducts, become so dilated about the origin as to form a sort of receptacle for delaying the bile before it passes into the *duodenum*; but in some, as the *quagga*, which is destitute of that bladder, there is no dilatation of the hepatic duct.

In the *sheep* there are hepato-cystic ducts, which terminate in the body or nick of the gall-bag.

In the *hog*, the *ductus communis choledochus* is of great size, and terminates very near to the *pylorus*.

In the *dog kind*, there is a gall-bladder, and the hepatic duct opens into the cystic, near to the neck of that bag.

In the *goat* and the *deer* the gall-bag is wanting, though they are ruminant animals.

† In the *horse*, the pancreas has an irregular form and three processes, and the biliary and pancreatic ducts terminate separately, although situated quite close to each other.

In the *hog*, the duct of this gland has its termination at a considerable distance from the *ductus communis*.

In the *dog*, there are mostly two pancreatic ducts, one of which unites with the *ductus communis*, or common biliary duct, and the other passes into the *duodenum* at a little distance farther on in the gut.

in which the insertion of the biliary and pancreatic ducts takes place in different sorts of animals, both as to their conjunction and the distance of the orifices of their introduction from the pylorus; these may be considered as circumstances which are of little importance in themselves, and which have very little to do with the functions of either the pancreas or liver.

SPLEEN.

This is an organ, which, in the cow, is of a deepish red colour, and which in all cases of this sort of animal is connected and attached to the left extremity of the first stomach or part, or that in which the esophagus has its termination, being consequently placed on that side and end of the paunch. It is kept in its situation by reflections of its peritoneal coat, and is connected too by its blood-vessels with those of the first cavity, or that of the great end or part of the stomach in these animals. In its shape, in them it is rather large, long, and somewhat flattish, being rounded off towards the sides and ends; but in other sorts of domestic animals its form varies considerably*. The intimate structure of this organ, in this kind of animal, though it has not been sufficiently explained, is much the same as that in the human subject; but the cellular appearance that has been long since noticed and described by Malpighi and some others, is more evident than in man or small animals, and the ramification or branching of the blood-vessels upon these cells is more discernible. It has been stated by Sir E. Home, that these cells are very distinctly seen when in the distended state; and that the roots of the splenic vein arise from the outside of the cells at right angles to their circumference, in the manner of radii. That in cases where the injection has not been very minute, they are seen to arise at so many points of the capsule; but that when the injection has got into smaller branches, their number is so greatly increased, that they seem to form plexuses round the cells. It has also been invariably found by him, that the small granules, considered as glands by the first of the above writers, and termed corpuscles by others, are distinct cells, which contain a fluid, when the stomach has taken in an unusual quantity of liquid. By puncturing the cells, when their membranous coat or covering became visible, this fluid was drawn away. It has been further ascertained, too, that the trunk of the splenic vein, compared with that of the artery, is in the proportion of five to one in its size; by which it seems, that the veins of the spleen exceed the size of its arteries in a greater degree than is noticed in the other organs of the body. It has been ingeniously suggested, however, that the cells have appeared of different sizes, and to have a very frequent communication with each other, by which the organ, particularly towards the surface, a good deal resembles the texture of a sponge. That it is doubtful whether the cells have coats proper to themselves, or whether they are not formed by the interspaces of the parenchymatous substance of the part. That the blood-vessels seem to communicate with the cells only, by their ultimate and most minute ramifications. The minute structure of this part would seem to deserve still further investigation and elucidation.

* It has in the *horse*, a flat and triangular form.
In the *deer*, it is flat and roundish.
In the *hog*, it is of great length.
In the *rabbit*, it is long and narrow.

PERITONEUM AND ITS DIFFERENT PROCESSES.

This covering membranous expansion in the cow has somewhat a similar structure to that in the human subject; but the reflections or processes of it which constitute the omentum, and the other enveloping parts of the intestinal canal, are considerably different in their form and extent. These last, in the several reflected parts, which have different names, depend greatly upon the length, and the convolutions which are made by the small and great intestines in these animals. The uses and intentions which they are destined to serve, are exactly the same as those in the human subject. In these animals, the cavity which is covered and enclosed by the chief portion of the omentum is very large, containing the four different stomachs, or parts of it, the duodenum, and the pancreas; and the reflections of it extend to and cover other parts. The omental covering, with its reflections in these beasts, are consequently very extensive, being in many cases much loaded with fat, which principally depends upon the nature of the animal, the rest it has, and the manner of feeding, but moderate warmth is likewise greatly beneficial.

KIDNEYS.

In the position of the kidneys in the cow, there is some difference from that in the human subject, in so far as that the right one is placed higher up, or more forward in the abdominal cavity than the left, which is often vulgarly termed the *close* kidney. The particular shape of the kidney in this sort of animal is well known for its long, thick, flattish, rounded, lobulated form, which has commonly from twenty-three to thirty divisions or small lobes; but the shape differs in different animals of other kinds*. The texture of the kidney is very fine, and the colour a dark red, it being composed of a cortical and soft medullary or glandular sort of substance, the parts or lobes of which are preserved and kept together by a kind of cellular material, and the number of the papillæ of which determine that of which it is constituted. These, likewise, in some measure, regulate that of the infundibula†. By these, a properly secreting organ for the urine is formed.

In the lobulated kidney, however, there is a calyx or infundibulum, appropriated to each of the glands of which it is composed, which unite to form a sort of pelvis for the ureters to arise from in some animals.

RENAL GLANDS.

These have their situation at the inner part of the kidneys, and, in animals of this kind, have something of the roundish form. The particular use of this gland is not well known, but it is considered as in some way subservient to the pur-

* In the *horse*, the form of the kidney is short and triangular.
In the *hog*, it is long-shaped.
In the *dog*, it is globular in form, and the part which transmits the urine forms a cavity, the surface of which is pale in the colour, like that of the *papillæ*.

† In cases where there is but one *papilla*, the *infundibulum* is mostly wanting, being confounded with the cavity of the kidney, termed its *pelvis*, as is particularly evident in that of the *dog*, in which the medullary substance that forms the papilla does not project into the cavity, but is flat or sometimes hollow: consequently, the cavity which receives the urine, and is the origin of the ureter, is not capable of sending off any processes or funnel-shaped reflections of its membrane. The *pelvis* of the kidney is not evident in these cases on the outside.

poses of the kidney. The arteries and veins of this gland do not invariably enter at one part, but in the lobulated kidney these vessels pierce the organ at the nearest part instead of passing at the sinus, or part where the excretory ducts come forth in preference to it.

The peculiar intimate structure of the kidneys, and these glands, seem to be perfectly similar to those in the human subject in animals of this kind, as well as most others.

In respect to these *renal glands* or *capsules* in these beasts, they have much resemblance to those of man, and their relative situation to the kidneys is nearly the same. In some cases they are attached to the kidneys, and not unfrequently the right one is fixed to the vena cava. Their size is different according to that of the animal, and their form flat, and somewhat triangular as in the human subject; but they vary in proportion to that of the kidney in different animals of the domestic kind*; and where that organ is lobulated in the structure, they, too, are mostly the same. These glandular capsules have the appearance of having two substances entering into their composition, as in man. The external portion of them, or that which is yellow, seems to answer to that of the cortical part in the kidney, but is brighter in colour and more thick, so as to constitute more than half the gland. By some, it is said, to be composed of fibres or tubes placed in a perpendicular manner in regard to the internal material, which is soft, and of a deep brown cast†.

URINARY BLADDER.

This, in the cow, is more loose in its situation, than in the human subject, but wholly covered by the peritoneum. The shape, too, is somewhat different, the fundus or bottom portion being the widest part in consequence of its being more dependant, from the nature of the position of the animal. It is large and very dilatable, but less thick and strong than in some other kinds of animals, so as to contain the water of the urine for a greater length of time.

The structure of the bladder in these animals is proportionally not of much more substance than that in man, but formed in a similar manner.

URINE.

The chemical nature and composition of this fluid in animals of this kind, seem not only to have considerable variation in themselves, but to differ materially in the same animal at different periods; which may, in some measure, account for the differences which have been afforded by its analysis in different instances. It would appear to have, for the most part, a greater consistence than in that of man, and a more greasy or mucous feel in them, as well as the *horse* and *ass*.

In the urine of the cow, the component parts have been found as below in the trials of Mr. Brande:

Substances.	*Parts.*
Water	65
Phosphate of lime	3
Muriate of potassa	15
——— ammonia	
Sulphate of potassa	6
Carbonate of potassa	4
——— ammonia	
Urea	4
	97

* In the *horse*, they are one-tenth of the size of the kidney.

† In the *deer*, there is a sort of cell near to the inferior and internal part of the eye, which is covered within by a continuation of the skin, and is lodged in an excavation of the superior maxillary bone; the parietes of which cell or sac are provided with sebaceous follicles which secrete a thick, black, unctuous or greasy substance. The different sacs open by a sort of slit, but have no connexion with the lacrymal gland, or the tears, as has been erroneously supposed by some, as whatever may be their use, they appear to be glands for the purpose of a particular excretion.

But, from the trials of others, as those of Rouelle, it would appear to consist only of these substances:

Substances.
Carbonate of potassa,
Sulphate of potassa,
Muriate of potassa,
Urea, and
Benzoic acid.

These two chemical inquirers are both, however, agreed, that potassa is the only alkali of the fixed kind, in the urine of the cow: but in that of other animals of the domestic and other kinds, the component parts appear to be different*. These trials seem to shew that soda, neither in its true or combined states, forms any part of the urine in this animal. And the same is the case in that of the *rabbit*, as seen by the note which has been just inserted.

These different analyses and examinations of the nature of the constituent principles and matters contained in the urine of different kinds of domestic animals, may be beneficial, by leading to a more correct use and application of it in the various intentions of the cultivators of land, as well as in those of many different arts of other kinds.

In the *plate* which is subjoined, at figure 2, are represented the several different internal parts and viscera of the cow, in their proper relative situations in respect to each other.

* In the trials of Vauquelin, the urine of the *rabbit* has been found to be composed of these matters:

Substances.
Carbonate of lime,
——— magnesia,
——— potassa,
Sulphate of potassa,
——— lime,
Muriate of potassa,
Urea,
Gelatine, and
Sulphur.

But the urine of the *horse* has been discovered by Fourcroy and Vauquelin, to have the component parts as below:

Substances.	*Parts.*
Carbonate of lime	11
——— soda	9
Benzoate of soda	24
Muriate of potassa	9
Urea	7
Water and mucilage	940
	1000

And Mr. Brande has found it in the *same* animal to contain these saline matters—namely, carbonate of lime and of soda, sulphate of soda, muriate of soda, benzoate of soda, and phosphate of lime, the parts of which were equal to about $\frac{1}{8}$ of the urine.

In the *ass*, the urine has been found, by the trials of the same experimenter, to be mucilaginous, but transparent at the same time. That, as in that of the *horse*, it changes vegetable blues to green, but deposits no carbonate of lime. It varies in its composition from that of the *horse*, by containing a much larger relative proportion of phosphate of lime and urea: it likewise contains carbonate, sulphate, and muriate of soda, and there seemed to be a small quantity of potassa, probably united to the muriatic acid. But no benzoic acid was discovered. It is worthy of notice, that the urine, both in this animal and in that of the *horse*, is wholly destitute of *ammonia*.

A, is the *œsophagus*, gullet, or hoosen, which is situated on the left of the *trachea*, or wind-pipe. B, the *aorta*, and *venæ cavæ*, or pipes, joined to the heart. The latter situated more forward towards the brisket than the former. C, the liver on the right side, under the lower or *close* kidney. D, the gall-bladder, cyst, or bag. E, the *rectum*, or bung-gut. F, the *duodenum*, or small round gut, joined to the last stomach. Figs. 1, 2, 3, 4, the four different stomachs or parts, displayed in their natural relative situations. G, the urinary bladder. H, the *diaphragm*, or part dividing the cavities of the thorax and abdomen, the fore part of which forms the brisket. II, the different lobes of the lungs in their natural situation.

SECTION 5.—*Blood-vessels, or the arterial and venous Systems in the Cow.*

THESE are very important in the cow, as furnishing not only the means of her support and growth, but that of supplying the large secretion of milk, which is so frequently demanded from her; and which, with the vast capacity of the stomach, is often so abundantly productive of this almost invaluable fluid.

HEART.

This is an organ which in the cow has much similarity in most of its circumstances to that in the human subject, only proportionally larger; and which is constantly enclosed in a pericardium; but, in consequence of the nature of its situation, is somewhat less connected with the diaphragm or part that divides the cavities of the thorax and abdomen. The form of the heart in these animals is that of an obtuse cone, and is placed in somewhat a longitudinal direction in the body of the animal, resting rather on the sternum than the diaphragm. In the right auricle, at the meeting of the venæ cavæ, there is a fleshy projection met with, which is termed *tuberculum* Loweri, but which does not exist in the human subject. The valve, termed Eustachian, is present in the heart of these animals, though wanting in some other quadrupeds. The foramen ovale in the full-grown animal is usually in the closed state. The auricles of the heart are the same in number and situation as those of the human subject; but the right or pulmonary ventricle is placed somewhat more on that side the aortic one, than in man; and the form of it is such, as that when the part is cut across, the section of the left ventricle is seen to form a sort of circle, and that of the other an appendix to it. The size of the different cavities of the heart, in these animals, are proportionally nearly the same as in those of man. The left ventricle has less difference than that of the right in these animals; but the columnæ carnæ have more strength, and are more numerous than in the human subject. The number of the columns of the tricusped valve, which fix it to the sides of the ventricle are likewise more in number. And the mitral valve in the cow, forms a sort of large monticuli, which fasten it to the sides or walls of the ventricle. In the semilunar valves there is nothing peculiar, their strength is similar to that, and the size of the arteries to which they belong.

ARTERIES.

These have something of a general similarity to those in man, but in the cow the aorta very near its origin, divides into two trunks, which have an inequality of size. One of which, the smaller, passes forwards in the body of the animal; and answers to the arch of the aorta, sending off the arterial branches that come from that part; the other which has twice the size, goes backwards, and occupies the place of the descending aorta; on which account, these arteries

have had the terms of *anterior* and *posterior* aorta applied to them.

The anterior aorta sends off branches which furnish the subclavian and carotid arteries*. The posterior aorta, in these animals, differs from that of the descending one in the human subject, principally in what regards the size and distribution of the branches of it, which are suitable to the nature and extent of the intestines, and the magnitude of the other viscera of the abdomen.

In the pulmonary artery, the difference from that in man is merely in the subdivision of the principal branches of it, which are answerable to the lobes of the lungs.

In the hog, the same sort of division and distribution of arteries likewise takes place.

It is not usual for the inferior thyroidal artery in these animals to be a branch of the subclavian, but of that of the carotid, which is situated higher up; and which is a distribution, it is supposed, that arises from the great length of the neck removing the gland of that name so far from the ordinary origin of that artery.

In these animals there is a very extraordinary peculiarity of the arterial vessels in that of the *plexus*, formerly termed *rete mirabile* of them; which is found seated at the sides of the sella turcica; and which consists of a great number of divisions of the internal carotids, turned, twisted, and united, within the head, into branches in the serpentine plexus manner, that afterwards unite and form a trunk, which again divides nearly as in the human subject. This has obviously, it is supposed, the effect of retarding the current of blood in its passage to the brain, which may be more necessary and useful in them, in consequence of the more frequent low position of the head than in animals where this plexus is not met with. There is said, also, to be a similar plexus of the carotid artery, near the jaws in these animals, as well as in *sheep*.

In the two mesenteries that are constantly met with in these animals, the primary branches of the superior mesenteric artery are numerous; and, of course, do not form such frequent anastomosis as exist in some other cases. But the inferior, or more properly the posterior, mesenteric artery is but small in them, and nearly confined to the rectum. The particular anastomosis between the vessels of the different mesenteries on the colon, is not met with in them.

The middle artery of the sacrum is large in these animals, as conveying much blood to the tail, but it arises differently in some others†. The primary iliac arteries are often not met with in these and some other animals, as the dog; but the external iliacs are formed by the bifurcation of the aorta; and the internal ones arise from a common trunk, but are much smaller than the external ones, and divide into

* In the *horse*, the anterior *aorta* soon bifurcates into two branches; the trunks of the two carotids, and the right subclavian, arise from one of the branches; the other has its termination in the left subclavian.

In the *goat*, the *aorta* is found to be divided in the above manner, into the ascending and descending, or anterior and posterior ones: the anterior of which is again divided into three branches, which furnish the left subclavian, the right subclavian, and a trunk that forms the two carotid arteries.

In the *dog*, which has not quite the same division as the above, the first of the primary arteries of the *aorta* furnishes a branch which subdivides into the two carotids, while the rest of the artery constitutes the right subclavian.

† In the *dog*, it has been noticed, not to arise from the *aorta*, but to be supplied by a thick short trunk, coming from the bifurcation of that, which also sends off the *sacræ laterales*, as well as the *hypogastric* arteries.

two main branches, which send off the usual arteries of the internal iliac, with the exception of the ilio-lumbalis, which comes in these animals from the external iliacs.

Sometimes in very old animals of this kind, as well as that of the *hog*, there are two small flat bones discoverable about the beginning of the aorta, which are ordinarily distinguished by the title of *bone of the heart.*

In the general structure of these vessels in the cow, there is much similarity to that in man, as they consist of the same number of coats, and have in general a similar proportionate relation in their diameters, and the thickness of their parietes or sides.

VEINS.

In the veins or vessels which return the blood to the heart, in the cow, there is commonly an almost perfect agreement with those in the human subject; much the same distribution and circumstances are common to both; for even where the arteries deviate in their rise and progress from what is met with in man, the veins mostly follow the same common course; and in the pelvis they are found to vary far less than what is the case with the arteries.

The vena cava, or vessel into which they unite, in their return from the extreme parts of the body, is very considerable in the size, which is necessary for conveying the return of so large a quantity of blood to the heart.

In the pulmonary veins there is no particular variation, they are correspondent in the number of their branches to that of the lobes of the lungs. In the valves of the veins in different parts, there is likewise the same similarity; but they have variations, which are important in some other sorts of domestic and other animals*.

In the general formation and structure of the veins and their coats, there is seemingly much similarity and agreement with those in the human subject. The proper membrane of them has been found by some to tear, in the manner of felt, into a sort of long silky filaments in the veins in some cases, which has been conceived to be generally an example of the nature of the structure of this coat.

VITAL TEMPERATURE IN DIFFERENT DOMESTIC ANIMALS.

This is important to be ascertained and known, as leading to many different circumstances of utility and advantage in the feeding, rearing, and keeping, as well as the general management, of all such animals. That degree or state of heat which an animal most commonly sustains when not exposed to, or under the influence of, the extremes of it, may be taken as the natural standard in all such cases. In the cow, the natural standard heat is some degrees higher than that in man, notwithstanding it is still below that which is found in some other sorts of animals, as *birds*.

From the experiments which have been made and related in the view of ascertaining and determining this matter, by having re-

* In the *horse*, valves have been found by Haller, at the rise of the branches of the *mesenteric* and *hæmorrhoidal* veins; as well as in those of the *splenic* veins of the same animal.

They are present likewise in the *pulmonary* veins of the *sheep* and the *dog*; and it is not improbable but that they exist in many other cases where they have not yet been discovered.

But the most extraordinary distribution and appearance in the veins is met with in the foot of the *horse*, where they are formed into an intricate sort of *plexus*, which wholly covers the surface of the coffin bone of the animal.

course to the scale of the thermometer of Fahrenheit, when introduced into different cavities of the body; which is probably the best and most certain method of accomplishing the purpose, it would appear that the standard degrees of heat in man and animals of this and some other kinds, are these:

In *man*, when the instrument is introduced either into the *urethra* or the *rectum*, it is made to rise to 97°.

In the *ox*, when the same instrument was introduced into the *rectum*, in the intention of shewing the difference of that in animals of the quadruped kind, there was a rise in the quicksilver to 99½°*.

These trials, with others, which have been made on the same subject, in different animals, some of which are stated below, seem to shew, that it may be safely concluded, that the standard temperature in animals of the cow kind surpasses that of man by a few degrees. It is ingeniously asked, by an able inquirer on this point, "in what manner can this fact be explained? Should it be attributed to there being less evaporation from the skin; or the natural integuments being better calculated for retaining the vital heat?" It is not pretended to answer these questions; but it is well remarked, "that although the natural clothing of an animal evidently tends to preserve its temperature from the influence of external cold, it does not seem capable of giving a higher standard of heat." It is not believed, that the standard of heat in such animals as have thick coverings of fur could be altered by depriving them of it.

Animals of these and other kinds have, in consequence both of "their usual coverings and the high natural standard 'of their heat,' great powers of resisting the effects of external cold;" which must frequently be increased by their resting and sleeping so much on the ground. They must obviously suffer much when it is brought low in any way, and be less usefully and advantageously kept and managed in many respects†.

* In the other trials of Mr. Hunter, when the ball of the thermometer was introduced two inches within the *rectum* of a healthy *dog*, there was a rise in the quicksilver to exactly 100½°. And on the chest of the *dog* being laid open, and a wound made into the right ventricle of the heart, there was immediately, on the bulb of the thermometer being introduced, a rise in the mercury to 101°. On a wound being then made into the substance of the liver, and the thermometer introduced into it, the quicksilver rose to 100¾°. It was afterwards introduced into the cavity of the stomach, when it stood exactly at 101°.

Upon being inserted into the *rectum* of a *rabbit*, the quicksilver stood at 99½°, as in the *ox*.

In the essays of Martine, on "Thermometers, and Heat," it is stated, that the temperature of the surface of the body is from about 100° to 102°, and sometimes 103°, or a little more, in animals of the ordinary quadruped kinds, such as *oxen*, *sheep*, *swine*, *dogs*, and some others; in which he seems, from the above trials, to be unquestionably somewhat incorrect. It has been suggested, that from making trials, in the intention of ascertaining the usual state of the temperature in different quadruped animals, it has constantly been found, that the "heat of the cavities of the body, in such cases was about 99°, 100°, or 101°, when they were placed in a medium natural to them, and that of the surface of the body, two, three, or more degrees, according to circumstances, below that of the interior of the body." That, "in quadrupeds generally," it is conceived, "the standard temperature should be stated to be 100°."

† In proof of the power which animals of this and other sorts have in resisting the injurious consequences of great exposure to cold, it was found, by Mr. Hunter, that he failed to freeze a *dormouse*, when even surrounded by a freezing mixture, until the hair of it was wetted with water. And that in another trial, a *mouse* which had been placed in an atmosphere as low as 13° above 0. of the thermometer, for the space of an hour, had not its heat diminished more than 15° at the *diaphragm*, and only 18° in the *pelvis*.

But when in a torpid state, or inclining to it, they are capable of suffering a great reduction of their natural tem-

SECTION 6.—*Absorbent Vessels, or glandular System, in the Cow.*

THE absorbent system in animals of this kind is constituted and consists, as in the human subject, of lymphatics, lacteals, and proper glands, with a thoracic duct; and which, in their structure, as well as many other circumstances, have likewise much similarity. This system of vessels is provided with suitable valves, and they have two general opposite terminations on the different sides of the neck part of the animals. They, however, differ somewhat in the distribution of the glands that belong to them, as well as in the origin, general course, and termination of their main trunk, that of the thoracic duct. The contents of these vessels have the colour much the same as those in man, which in the lacteals is of a sort of milky whiteness, as the term implies. Lymphatic vessels have been seen in these and other sorts of animals, as in the human subject, in all the different parts of the body but the brain and spinal marrow, in which they have not hitherto been ascertained to exist. In the internal viscera of these animals they are seen with great clearness, and to much advantage*.

These conglobate glands are somewhat proportionally less in number than in man, but larger, and more collected together. In the mesenteric glands of these animals, as well as some others, there is a sort of collection into groupes or masses; but in addition to these, there are distinct ones dispersed over that covering, that are apparently proportionate to the great size and length of the intestines in this sort of animals. But it is at the root part of the mesentery that these glands are congregated into the principal mass; in which case they are connected with each other by the medium of the cellular material, and afford exteriorly an inequality of surface. This collected union of mesenteric glands was formerly mistakenly thought to be a pancreas, by Asellius, and has constantly since retained the title of *pancreas Asellii.*

The absorbent vessels seem to be less connected with their glands in these animals than in man, as in them, many branches appear to go directly to the common trunk, without the intervention of glands; but, in the human subject, it rarely happens that any reach the thoracic duct, or main trunk, without before entering one or more of them. There is usually in these animals a considerable dilatation taking place at the origin of the *thoracic* duct, or a large sort of *receptaculum chyli;* but the size or bulk, and the course of that duct, are liable to vary among individuals of the same sort in this kind of animals†. But it does not make any circuitous turn before its termination, as the horizontal position of such animals admits of a more ready course to the contents of it. There are in the vessels of this sort, in these animals,

perature, with equal impunity as the more imperfect animals. Thus, in an atmosphere of 26°, a torpid *hedge-hog* was only 30°, notwithstanding the same animal, when roused, was exposed for two days to the same atmosphere, and the internal heat, as tried by the *rectum*, did not sink below 93°.

* In the posterior extremities of many large animals, such as the *horse*, they are capable of being traced with much facility and readiness. And in the *sheep* and the *goat*, as well as in some others, the *lacteals* are found to run in trunks of considerable size and perspicuity. In the *dog*, too, they are readily detected, by feeding the animal with milk, or some other coloured nourishing material, and then, in a few hours afterwards, causing the *abdomen* to be laid open.

† It has been stated, that there is sometimes an *annular dilatation* at the upper part of the *thoracic* duct in the *dog*, and which has been considered, by Van Bils, as a constant structure, and called by him, *receptaculum tortuosum.* This duct is double, or forms two distinct canals, in some quadruped animals, as in this. It

a less number of valves, than in those which move in the upright position*.

The internal structure of the absorbent glands, in this kind of animals, is probably much the same as that of those in man, but the intimate minute structure in neither has probably been hitherto sufficiently determined.

Section 7.—*Trachea, Thyroid, or Bronchial Gland, and Lungs in the Cow.*

In the first, or *trachea*, there is much the same structure prevailing as in man, and the number of the *bronchi* are the same as those of the lobes or divisions of the lungs. In the cartilaginous rings of the trachea, in animals of this kind, they approach nearer to a circle than in the human subject; consequently, the opening behind is proportionally less extensive, being scarcely any at all, as the extremities of the cartilages in them, in some measure, meet behind in a sort of acute angle. This bronchial formation of the rings of the trachea contributes to many advantages, in the breathing and other functions of the lungs. The particular situation of the trachea, in relation to the œsophagus, and other parts, may be seen at the letter A, in the subjoined *plate*.

THYROID GLAND.

The particular use of the *thyroid* or *bronchial* gland has not hitherto been explained, but its situation being so near to that of the lungs, it may probably have in some way a beneficial utility in regard to them. Its size is proportionately less in animals of this kind than in man, but in other respects it seems to have considerable similarity. It is composed of two lateral portions, or sorts of lobes, which are joined together by one or two thin stripes, that mostly pass over the front part of the trachea or surround it. The form of it is rather long and somewhat large in these animals; and in the *sheep* it is the same. It is fully supplied with blood-vessels, but is without any excretory duct. It is but little connected to the sides of the trachea in these sorts of animals†. In the internal structure as well as situation of the gland there is a sameness to that in man‡.

It has been stated, by an able veterinary surgeon, that he found the *thoracic* duct in the *horse* forming several lateral communications at the lower part of it with the lumbar veins; but the accuracy of the statement cannot but be disputed, as the fact, were it so, would form too extraordinary an exception to the system of absorption, as it has been found to exist in all the higher orders of animals. There are, notwithstanding, without doubt, many varieties in the form of this duct, and the distribution of the absorbent vessels in these and other sorts of animals, which have not hitherto been discovered, but they would probably cast little or no new light on the nature of absorption.

* In the *horse*, there is only a single pair observed; while in the human subject there are many valves formed for the purpose of aiding and favouring the passage of the lymph and chyle, or at least for preventing the reflux of them.

† This is so much so in the *rabbit*, that the gland is found to be moveable.

‡ The organization of it has been much explained by what has been found to be the case in some animals of large size, where the gland is also large. In these it has been found to be surrounded by a thick *aponeurosis*, in the substance of which the thyroid vessels divide before they enter the gland. Each lobe of the gland is composed of about thirty smaller lobules, which have a firm texture, and are separated by peculiar cells that are formed by an extremely fine membrane. They are but slightly connected with each other, and with the lobes that surround them, so that they seem to serve only as the basis for the smaller ramifications of the vessels that penetrate the gland. It is by means of these vessels, it is supposed, rather than the cellular tissue, that the different lobules are joined and held together. The ascertained existence of cells in the thyroid gland of such large animals seems, it is conceived, to justify the opinion entertained by some, that the cellular structure noticed in *bronchocele* is produced by the natural cells of the part becoming enlarged.

LUNGS.

The general figure of these is in some measure regulated by that of the form of the cavity of the thorax in the particular animal. In these, where the chest is full and rather long, the shape is somewhat thick and of a tolerable length; but it differs considerably in some other animals*.

In their form, connexion, and general structure, the lungs in the cow kind of animals agree in a great measure with those in the human subject; but the left has a greater proportion to the right than in those of them. And in these cases, they are likewise more closely applied to the sides or walls of the thoracic cavity.

In these animals they are constantly divided into lobes, and the divisions have somewhat more depth in proportion than in those of man; those of the right side lung being more than in that of the left. In different kinds of quadruped animals of the domestic sort, the lungs are differently divided in respect to their lobes†; and in the situation of them there is also a variation in some kinds of quadrupeds‡.

In regard to the minute organization, or structure and formation of the lungs, which consists in the distribution and arrangement of the arteries, veins, and air-tubes, or vessels, it is in all respects perfectly similar to that in the human subject.

SECTION 8.—*Organs and Parts used for the Purpose of Generation, in the Bull or male Animal.*

THERE are many different organs and parts necessary in the exercise of the generative functions in this as well as other sorts of animals; but the particularly essential ones are those of the testes and penis, with their several connected appendages.

TESTES.

These are constantly at first formed and situated in the lumbar region, near to the kidneys, as in man. In animals of this kind they are two in number, which soon leave their seat in the loins, and fall down somewhat behind the opening of the ring of the abdominal muscles, and when thus on the outside of the body, become suspended in a scrotum or sort of bag behind the penis, which is divided by a kind of septum into two perfectly distinct pendulous bags, which are of less size. This septum or partition between them is formed of a sort of cellular substance, which is suitable for the purpose by its elasticity and softness.

The form of the testes in these animals is somewhat oval, and the size but rather small in proportion to that of the animal.

In addition to the scrotum, the testes have a tunica vaginalis, as in man, and there is constantly but a very small passage leading be-

* In the *horse*, the *diaphragm* passes up into the thorax, much beyond the margin of the ribs, so that it receives a portion of the viscera of the abdomen. Consequently, the bulk of the lungs is still preserved in a due proportion to the size of the animal, though the form of the chest externally might sometimes render it apparently otherwise.

† In the following sorts of animals, the number of the lobes on the different sides are found to be these:

Names.	*Right Side.*	*Left Side.*
Ruminants in common	4	2
Hog	4	2
Rabbit and hare	4	2
Dog	4	3

‡ In some, as the *dog*, one of the lobes passes behind the heart, and between it and the right side of the *mediastinum*;

tween this coat and the abdomen, which renders the animal but little in danger of *hernia*, this being the highest part of the belly, or, at least, that upon which the viscera press less on the abdominal rings than on the others. The testes in these animals are likewise covered by the tunica albuginea, which is rather of more thickness than in some other cases.

The interior structure of the testes is essentially the same as in man. The seminal tubes are in a sort of separate collections or bundles in these beasts*.

The epididymis, which is rather small, is fastened to the testicle somewhat as in man. The vasa deferentia are rather thick and firm in their texture, and proceed rather directly to their termination in the urinary passage; they may probably, too, have some little dilatation before their termination. This last is particularly the case in some other sorts of animals, as happens in man†.

The vesicula seminalis in the male of this sort of animals is wanting, though it has been supposed by some that the prostate glands in them were a kind of vesiculæ seminales. But the only part that in the least answers to any thing like these vesiculæ in these animals is said to be a sort of ligamentous bridge that extends between the ends of the prostate glands in them‡. In other animals of the domestic

on account of which a blast or rush of air is often noticed on opening the cavity of the thorax, which has sometimes been mistaken for air confined, during life, between the lungs and their parietes.

* In the *ram*, the *tubuli seminiferi*, or seminiferous tubes, have been noticed to be very distinct, and to have a serpentine or sort of undulating course.

In the *boar*, these tubes are collected into bundles.

In the *horse*, *ram*, *dog*, and some other animals, the structure of that body or part known by the title of *corpus highmori* is distinctly seen. It seems neither to be a canal, nor to possess that sort of structure, of old ascribed to it, but to be formed by the *tunica albuginea*, and proceeds like a ligamentous stripe, fillet, or band, along the testicle, from which the *laminæ* or fibres that run downwards and separate the seminiferous tubes of the gland arise. It is, in fact, constituted of a sort of condensed cellular substance, running longitudinally close to the *epididymis*, which sends off *septulæ* between the different bundles of the seminal tubes of the testicles, in order to protect and bind them together.

† The *vasa deferentia*, in some cases are enlarged and cellular internally, for some space before their termination. In the *horse*, they are dilated to about the size of the human thumb, for the distance of five or six inches before their termination. This dilated portion consists of a number of cells, which have much resemblance to those of the *corpora cavernosa* of the *penis*, and which, when pressed, pour out a thick whitish sort of fluid into them from small orifices internally. And it has been stated, by an experienced veterinary surgeon, that the *vasa deferentia* in this animal, run in the centre of these cells, with each of which they communicate by a sort of small pores.

In the *ram*, too, there is a similar dilatation in the *vasa-deferentia*, in which there are transverse *laminæ*, that form a sort of mesh, or net-work; and from the little openings internally, on the sides of which the same sort of fluid as above is found to pass out.

In the *buffalo*, the *vasa deferentia* are still more dilated than in either of the two animals that have been just noticed; but they are not divided into cells or meshes, these being little cavities which secrete a proper fluid. The same sort of dilatation likewise takes place in some other *ruminant* animals, but to a less degree.

The design of nature, in this dilated structure of these parts, would appear to be, the addition of a particular secreted fluid to the semen, before it passes or is thrown into the urethra, which may be beneficial, by diluting and rendering it less concentrated and tenacious.

‡ This kind of ligament has been noticed to exist in the *ram*, while in the *venison* or *fallow deer*, the place of the ligamentous part is taken up by two little capsules, which seem to be glandular and the cavity of them to lead to the *verum montanum* by the same orifice or opening with that of the *vasa deferentia*.

kind this vesicular part is variously supplied*.

The vesiculæ accessoriæ in the males of this sort of animals are wanting, as having prostate glands; but something of the same kind exists in other animals which have these glands in an extensive manner†.

The male animals of the neat cattle kind have the prostate gland double, or there are two prostates in them, and the lobes of these glands are very distinct in the bull as well as in the ram. In their structure they are cellular, each gland containing one principal cavity with which the smaller cavities communicate; the latter of which fill the indistinct lobes that are visible upon the glands externally. The principal cavity of each gland produces a duct, and these ducts terminate separately at the side of the verum montanum. They are situated about the neck of the bladder, so as in some measure to surround the beginning portion of the urethra, and terminate in that canal in a suitable manner. But this gland varies in animals of other kinds which are domesticated as well as those which are not‡.

The glands that have been called Cooper's are not distinctly marked in the males of this sort of animals, but they may probably be found in some measure to exist in them, as they are met with so commonly in many sorts of large animals in differently connected states with the prostate and other parts near it. They are, however, wanting or not well ascertained in several other animals of the domestic sorts §.

* In the *horse* and the *ass* these *vesiculæ* are two long membranous sort of bladders, similar to portions of an intestine. They have a greater width at the end or *fundus* than at the neck part, which ends in a large excretory duct or canal, that opens into the urethra by a common orifice or opening with that of the *vas deferens*.

In the *boar* these *vesieulæ* are particularly large, and are composed of lobes and lobules that contain cells interiorly, which communicate with each other. The whole of the lobes pour out their contents through a common canal that opens in the *verum montanum*.

The *rabbit* and *hare* have one sac simply, in the place of the *vesiculæ seminales;* which is of a considerable size, and of a rectangular form. The external corners are sometimes extended from the body of the sac, and represent the two *vesiculæ*. The coats of the sac are membranous, except in the two thirds of their superior side, which are very thick and glandular, being similar to the substance of the prostate gland. The sac has its opening into the urethra single.

† In the *horse* there is a sort of cylindrical vesicle placed between the *vasa deferentia*, which terminates in the urethra, before the openings of the *vesiculæ seminales* and *vasa deferentia*. These *vesiculæ accessoriæ* are considered as a distinct sort of glands, in consequence of their having a structure similar to that of the *vesiculæ seminales*, and because they are noticed to enlarge in the time of the procreating season. They are various in the number of their tubes, and are situated at the inner side of the vesicle of the *semen*, or at the origin of the urethra. They terminate by one or more excretory ducts in common with the *vesiculæ seminales* and *vasa deferentia*, or in a separate manner. They are similar in their structure to that of the seminal vesicle, and are filled too seemingly with the same kind of fluid.

‡ In the *horse*, the prostate gland is quadruple, or there are four of them; of which the two primary ones are paler, and have larger cavities than the other two. They are covered with muscular and tendinous fibres, which are extended to them from the *vesiculæ seminales* and the sides of the bladder. The ducts from this pair of glands have many orifices or openings in the urethra. The other pair of prostates are situated towards the end of the membranous portion of the urethra; and are enclosed by muscular and tendinous fibres. They have each twelve ducts, which open by an equal number of orifices arranged in a row internally in the urethra.

In the *boar* it is divided into lobes, and there is besides a layer of glandular substance, that surrounds the origin of the urethra.

In the *dog* the prostate gland is single.

§ They are ascertained to be wanting in the *horse*, the *ass*, the *deer*, the *rabbit*, the *hare*, and the *dog;* but in the *boar* they are found in the form of long flattened cylinders. The substance of which they are composed has a firm texture; it

PENIS.

This, in the male of this sort of animals, is single, and situated under the belly, passing forwards towards the umbilicus, where there is an opening or orifice for its exit, being enclosed in its course in a sort of sheath, which is formed and suitably lined by the skin and the different integumental matters. In consequence of its great length when it becomes flaccid or relaxed in the sheath, it turns more or less in a serpentine or waving manner. It has on each of its different sides a muscle, which arises from the fleshy expansion of those of the middle of the abdominal cavity, and which after uniting the fasciculi of it, is fixed into the sides of the anterior part of the prepuce or sheath; and another which arises from the caudal vertebræ or that of the tail, or the muscles about the anus, and is inserted upon, or into the sheath that covers the penis; the former being the adductor by which the sheath is drawn forwards, and the latter the retractor of the prepuce or sheath by which it is opened and brought backwards.

The shape of the penis in animals of this sort is long and slender, somewhat tapering to rather a sharp point; but it is different in other domestic quadrupeds*. The crura penis are of no great length, but they are closely attached to the bones. The corpora cavernosa are formed of two distinct branches, which arise from the ischium, and are afterwards seemingly joined into one body; but the division of this part of the penis interiorly, by a septum, is wanting in these animals. Here the ligamentous laminæ arise from within the circumference of the united cavernous bodies, and meet in the centre of them†. The urethra commences, and is continued from, the inner coat or lining of the bladder of urine, as in man. It is divided into a posterior and anterior portion; the former of which, receives the semen and the fluid of the prostate gland, at the side parts of the verum montanum. This posterior portion,

contains small cells, which open into larger ones, and they again join to form a common cavity, from whence a canal proceeds to open upon the side of the urethra, within the bulb of it. The muscle of them has the fibres oblique.

The texture of these glands is close in many animals of the *ruminant* and other sorts; and they are constantly filled with a fluid of a peculiar sort, which is of a bluish white cast, and thick mucilaginous consistence, and which passes into the urethra by a single duct. They have generally a sort of muscular sheath, which includes them, and which may render them capable of expelling the fluid which is contained by them.

* It is thick and cylindrical in the *horse*; but slender and somewhat twisted in the *boar*.

The size and shape of the *penis* are in some animals partly influenced and determined by an *os penis*, or bone in it, which also directs it into the *vagina* of the female, and is otherwise useful in copulation as will be more fully explained hereafter, in considering some other parts. This is the case in the *dog*, in which the *os penis* is grooved in the lower surface for the purpose of holding the *urethra*; and the bone forms a principal part of the *penis*.

As some quadrupeds of the domestic and other kinds, where by the older naturalists noticed to void their urine in a backward direction, as the *cat* for example, they were inclined to believe that in some instances they copulated in the same manner, but later more correct observation has shewn the contrary to be the case.

† In the *dog*, there are two *corpora cavernosa*, with a *septum penis*; but where the last is wanting, there is but a single *corpus cavernosum*, as has been seen.

The interior of the *corpora cavernosa* in the time of the erection of the *penis* has been stated by some as being composed of an arrangement of the branches of the veins in an anastomosing manner with each other, so as to form a sort of very close and intimate inextricable *plexus*, in the manner of, and somewhat similar to, that of cells. But it has been ingeniously suggested by an able inquirer in these matters, that though it has been discovered that the spongy part of the *urethra* is composed of ramified vessels in quadruped animals as in man, it has not been satisfactorily found that the *corpora cavernosa* are formed in the same manner.

which is of some length in these animals, is somewhat muscular, as being encased in a layer of fibres of that kind, which run, in some measure, in a transverse direction, having much thickness and strength in these animals, and thereby aids the expulsion of the semen in the time of copulation.

The latter, anterior, or other portion of the urethra, which has much less length, commences by a sort of bulbous dilatation, and is situated under the corpora cavernosa, enclosed by sides or walls of the same nature as those of these spongy bodies. It begins backwardly by two crura, each of which is enclosed by a separate muscle. In these animals the bulbous dilated portion of the urethra is of much strength, which is probably of great utility in the act of copulation*.

In animals of this kind, the corpus spongiosum part of the urethra is large, and is supposed to be composed of an intricate plexus of the ramifications of veins as already stated†.

The glans penis in these animals is somewhat round and taper-pointed, having the orifice of the urethra in the middle of it; but it varies in other domestic sorts of animals‡.

In quadrupeds of this large kind, the muscles of the penis are more in number and of much greater strength than in the human subject. In these cases there is a muscle on each side which arises from the tuberosity of the ischium, and ascending in an oblique manner inwards, is inserted into the dilated bulbous part of the urethra, the use and effect of which have been noticed above. The erectores penis, or ischio-cavernosi muscles, are more strong proportionately than in man, but in other respects they differ little§. The accelerator urinæ, or bulbo-cavernosus, is here rather thicker than in man in proportion to the size of the animal. as from the structure of the urethra, the diffi-

* In the male *hog*, there is a *cul de sac* at the origin of the latter portion of the *urethra*, or that which answers to the bulb in other animals. This sort of *cæcum* in it, receives the semen, and the fluid of the glands termed Cooper's.

† In the *horse*, this is particularly evident where it forms the *glans penis*, in which the vessels very plainly appear. They likewise communicate with a vast mass of vessels of the vein kind on the *dorsum* of the *penis* in the same animal, which increase the size of it very greatly when they are distended with blood in the time of erection.

In the *cat kind*, the *glans* is conic in shape, the point being made by the *os penis*, which projects beyond the orifice of the urethra, and is in most sorts of them armed with reflected sharp hard spines, which are probably the cause of the disagreeable noise made by the female in copulation, and of her conception, by lessening the sensation of pleasure.

‡ In the *horse*, it is somewhat broad and dilated, as in the human subject.

In the *ram*, it is oval, with a transverse fissure at the end. The orifice, or opening of the urethra, is at the left side of the slit, and near to it there is a long slender tendinous process.

In the *boar*, it is very taper and pointed, having a fissure upon its side, in which the urethra terminates.

In the *dog* kind, the back of the *glans* form a very extraordinary bulb of the shape of a chestnut, which has its base posteriorly. It is constituted of venous cells, which are only distended when the *penis* is erected, and is compressed behind the *glans*, there being two large trunks of veins running in a backward direction, which carry off the blood from the bulb. It is in consequence of, and by means of, this structure and apparatus, that the *penis* of the animal is retained and continued in the female organs, as it were, against its will. The sphincter of the *vagina* takes on a sort of spasmodic contraction, and thereby compresses the veins behind the bulb, and thus keeps them in a state of distention. But to obviate the effects of this sort of compression upon the *urethra*, that part of the canal is lodged in a groove of the *os penis*, as already seen. The semen of the *dog* passes in jets for some time after it has come off the female, in consequence, as has been supposed, of his wanting *vesiculæ seminalis*.

§ In the *horse*, they are weak, but without being divided in their parts.

culty of ejecting the urine and semen is not great*. There are other differences in the muscles of these parts in some other animals†.

In the arteries and veins of these parts there is little difference from those in man, except those which have been already pointed out as respecting their plexuses; but the nerves of this organ are larger in proportion.

SECTION 9.—*Organs and Parts employed for the Purpose of Production in the Female or Cow.*

THE female organs and parts of generation in these animals may be considered as external and internal. The former, which comprehends the shape, opening, or orifice of the *vulva*, is not provided with either external or internal labia, properly termed such; in the place of them there is a thin sort of border of the integumental parts. It is a perfectly simple fissure or longish sort of opening, which has somewhat the direction of the body of the animal. This part in these quadrupeds is not a mere entrance to the vagina as in the human subject, but forms a canal of some length before reaching the true vagina. The surface of the vulva, internally, has numerous very fine undulating slight transverse rugæ which disappear on the part being stretched. The part which may be termed clitoris, is placed further inwards, in consequence of the vulva forming a canal, but its situation is necessarily the reverse of that in the human subject, as the part of it next the pubis is the lowest on account of the horizontal position of the animal. This part in its form and structure has much similarity to that of the penis in the male, but it varies in other sorts of animals‡.

The existence of a membrane, similar to that of the *hymen*, in these and other sorts of quadrupeds, is disputed by some, though in form and situation there is something of the kind met with. The *nymphæ* are wanting in these as well as many other sorts of animals, the defect of them being provided for in copulation by the large quantity of blood that distends the vessels of the parts at the time.

In the cow, the *vagina* is separated from the vulva by a kind of contracted circle, but in some other cases it is different, as by one or two plicæ§. The orifice, or opening of the urethra, is here found upon the extremity of the inferior part of the vulva.

The length of the vagina in these animals is considerable, as being somewhat in proportion to that of the vulva, and the size of the fœtus

* In the muscular structure of the *horse*, this is not confined to the bulb of the *urethra*, but forms a layer of transverse fibres which cover the latter the whole way to the *glans* of the *penis*.

† In the *hare*, the muscle for raising and sustaining the *penis* is twisted backwards, in order to give the proper direction to the *penis* in the time of copulation.

In the *dog*, there is a muscle arising from each of the roots of the *corpora cavernosa*; and which are conjoined by a middle tendon that is inserted into the back of the *penis* under the *pubis*.

‡ This part in the female of the *dog* kind, wants a bone, notwithstanding there is an *os penis* in the male animal; and the prepuce of the *clitoris* in the female of the same animal forms a *deep sac*, in which the latter is nearly concealed. The prepuce in this case, too, is furnished with a number of sebaceous glands, similar to those of the *penis*.

§ In the *bitch* and the *cat*, it is the same as in the first.

There is in the *mare* and *ass*, which have been never yet covered, the appearance of a strong semilunar fold in the under part of the orifice of the *vagina*, which has been supposed by some to be analogous to the *hymen*, though in this there is no very strict resemblance to that in the female of the human kind.

in them, which is large. It is commonly of less width than the vulva in those animals of this and other sorts, which have not yet had any young*. This part is a sort of continuation of the uterus, lying pretty much in the same line of direction with that part. Its width is in some measure answerable to that of the size of the penis in the male. It has on its inner surface rugæ running in a longitudinal direction of it, which are greatly favourable for its dilatation in the time of bringing forth.

UTERUS.

The uterus, in these animals, is of the *simple horned* kind, these being formed, one on each side, by a sort of prolongation of the body of it. These prolongations are termed *cornua*. The extent of the lateral cornua or portions are here considerable, as extending into the loins, the broad ligaments of the part being much spread out, and there are muscular fibres placed between their different laminæ. They are said to form various fasciculi in the female of this kind of animals; one of which, of the greatest strength, extends from the ovary to the neck part of the uterus. It nearly reaches these parts, but for what use or purpose is uncertain. In addition to these, there are some transverse fibres, which pass from one horn of the uterus to the other, in the first third of their length. The round ligaments, too, possess muscular fibres in them. In some other sorts of animals there is a double uterus†.

The situation of the uterus is in the hind parts of the animal, near to that of the urinary bladder, lying horizontally with that of the body, and extending in the loins to the back part of the kidneys. In its texture it is thinner, looser, and less firm than in the human subject, and internally is provided with a sort of glandular membrane, but is without the transverse rugæ, which are met with in the human subject, so as to have the appearance of a sort of intestine, but is provided with a true muscular coat that has considerable strength and power.

In the uterus of these animals there is not properly that sort of projection around the orifice or opening of it, which is known by the title of *os tincæ* in the human subject; the *os uteri* here being a kind of transverse slit at the end of the vagina, and so far on the lower part of its canal, that the parietes or sides above make a sort of cell or dilatation over it. There is a projection made by the vagina that would appear to have a tendency to impede the passage into the uterus.

The structure of the uterus is thin in its parietes, being composed of red muscular layers, in addition to the internal membrane and external coat, much similar to the manner in which the intestinal canal is formed. These muscles are particularly evident in the double or horned uterus of these large animals; the cornua having upon them a transverse layer of muscle, which is covered by a thin layer of longitudinal fibres. But in the neck part of the uterus there is only the transverse layer present; the principal thickness of this part in the cow kind, being constituted of a material of a white hard texture, similar to the substance of the human uterus. There is in the internal membrane of the body of the uterus, and its cornua, a sort of longitudinal folds met with,

* It is twice the length of that part in the *dog* and *cat* kind; and in the former there is a remarkable dilatation, which is suited to hold the large bulb of the dog's *penis*.

† In the *rabbit* and the *hare*, the *uterus* has the appearance of two *horns*, which open separately into the *vagina*, there being no part answering to that of the neck in it.

but which in some other sorts of animals have quite the contrary direction.

The *ovaria*, in these animals, are as constant in the females as the *testes* are in the males. They are situated on the sides of the uterus, near to where it advances to the kidneys, are somewhat oval in their shape, and have the *ova* lodged in the substance of which they are formed*. The nature of the tubes of the uterus is similar to that in the human subject. In these cornuted *uteri* they are fastened to the horns, and are convoluted in their manner; but the dimensions of them are constantly much smaller than that of the horned parts.

CHANGES UNDERGONE IN THE GRAVID UTERUS.

These are several in the different parts after impregnation. That part which answers to the *os tincæ* is closed very soon after that has taken place, by means of a peculiar sort of glutinous mucilaginous matter, which is secreted by the glands or follicles of the part, which prevents all communication between the external and internal parts, and at the same time hinders the lips of the uterus from uniting and growing to each other. The *corpora lutea* are now found to be present, which, in this kind of animal, are large and of a yellow appearance, but which varies in other sorts, according to the nature of them. In the gravid state of the uterus, too, the muscular fibres become less distinct than in that of the unimpregnated one. The changes in the uterus of this cornuted kind, extends from the uterus to one of the cornua, but differs in many other sorts of domestic and other animals†. The connexion between the *uterus* in its gravid or impregnated state, and that of the surface of the *ovum* is, accomplished in the case of this kind of animals, by means of *placentulæ* or *cotyledons*, which are upon the superficial part of it. These have an adherence to the glands produced from the inner side of the uterus, and these *glandulæ uterinæ* have many papillæ and cells or hollows, which answer to those of the cells, hollows, and papillæ, or processes of the *placentulæ*. They are very highly vascular, and possess a milk-like fluid, which is capable of being easily squeezed out from them; though an injection of any sort cannot be made to pass from the vessels of the *placentulæ* to those of the *glandulæ* of the part. There is a sort of union of the cotyledons and glandulæ to each other, the former of them appearing to enclose the latter, from which they have most probably gained their title; but they are capable, at the latter period of gestation, of being readily separated from each other. The cotyledons are evacuated and discharged with the after-birth, there being a gradual diminution in the size of the glandulæ after the contents of the uterus have been evacuated, but they exist in the uterus as well in the gravid as in the unimpregnated state. The form and number of these excrescences are various in different sorts of animals‡.

* They vary in the circumstances of their form and number, in different animals. In the female *hog* they are tuberculated. In other animals they are in clusters, as grapes. And in number they are generally answerable to that of the quantity of the young which the animal is capable of producing in the course of her lifetime.

† The manner of connexion between the *uterus* and the surface of the *ovum* in the *mare* and the *sow* is very different; the whole exterior surface of the *ovum* is firmly adherent to the *uterus*; or there is found a sort of bag-like *placenta* or after-birth. And in the *dog* and the *cat* kinds, as well as in some others, there is a simple *placenta* of a sort of *girdle* or *belt* kind.

‡ In the *cow kind*, and the *sheep*, they are from about seventy to one hundred; and in some animals they are on the external part, somewhat concave, in others convex.

The *involucra*, or enveloping parts of the fœtus, consist of an outer membrane termed *chorion*, and an inner one called *amnios*, which secretes the fluid in which the fœtal animal swims. But contrary to what takes place in the human subject, these membranes are spread with blood-vessels, arising from those of the umbilical cord that forms the connexion between the fœtus and the placental parts and the mother.

In the interspace, between the two membranous coverings, or those of the *chorion* and *amnios*, there is a kind of bag, which has the name of *alantois*, but which is destitute of blood vessels; it receives the urine from the fœtal bladder by a sort of canal or passage named *urachus*. In this sort of animal it occupies or covers only a portion of the *amnios*, but in other animals of the domestic sort it differs*.

The length of the umbilical cord in these animals is somewhat proportionally shorter than that in the human subject; and it has two veins of the umbilical kind united into one trunk near to or within the body of the fœtus. But this cord is otherwise formed in some other animals†.

FŒTAL STATE, AND MANNER OF SUPPORT, FOR A TIME, AFTER BEING BROUGHT FORTH.

The fœtal situation and circumstances in these animals is much the same as that of the newly-dropped young of most other kinds; but the cow rarely produces more young at a time than one; though this is different in many other sorts of animals‡.

The nourishment and support of the calf, in its first stage of growth, after being brought forth, is, as in many other cases, by the milk of the mother, secreted and provided by the udder, which is a large glandular body seated somewhat between the hind legs of the animal. This part is not bulky, as possessing little fat, unless when much distended with milk, which it should never be suffered to be, as tending to produce disease in the parts.

In the cow, there are mostly four teats projecting from the udder, but this last, as well as the number of the former, is various in different animals§. In some, the breasts or udder parts extend along the sides of the abdominal region; in others, along the thorax also. In its structure the teat is hollow internally, which hollow is connected with two receptacles in which the milk tubes terminate, and from which that fluid is drawn mostly by a single orifice or opening externally in the point of the teat, but in some particular instances two are to be seen in that part.

* In the sheep it is the same, only covering a part; and in the *sow*, it takes up but a very small portion of the membrane of the *amnios*.

The *alantois* is wholly wanting in the female *dog* and *cat*, in the place of which, there is a sort of membrane met with, which has the title of *tunica erythroides*, and which, at the beginning of the state of pregnancy, contains an aqueous kind of fluid. It is connected to the mesenteric vessels of the fœtus, but is without an *urachus*. This is more particularly connected with the early state of pregnancy, as is the case with the *visicula umbilicalis* in the human subject.

In the *mare* and the *sow*, there is a sort of fleshy-like mass contained in the *alantois*, which has been conceived by some as a matter let fall by the urine in the fœtal state, and called *hippomanes*, or *horse-venom*; but the nature and composition of which has not yet been fully investigated.

† In the *foal* of the *mare*, there is but a single vein in the cord of this kind.

‡ The *ewe* has often two, and sometimes three and four. The *sow* a great number, as eight, ten, or more; and the *bitch* and *cat* mostly a large number. Such animals as are tamed are found to have more than those that are in the wild state.

§ The number of teats are usually, but with many exceptions, about twice that of the fœtal produce of the animal at one time.

In

SECTION 10.—*Brain and Nervous System.*

These are particularly important and useful, as enabling the animals to perform many of their functions and actions in a suitable and proper manner.

BRAIN.

The brain in this sort of animals fills up the whole of the cranium, and consists of much the same parts, and is constituted in nearly the same manner as in man; but is distinguished from that by some peculiarities. The principal differences are those of its being of less size in proportion to that of the whole body; as well as to that of the cerebellum and spinal marrow; and more especially to that of the nerves which arise from it. It has been conceived that the relative size which the brain bears to that of the whole body is decisive of the particular degree of intellectual power which the animal possesses. And, that the mental state should be indicated by the proportion which the perceptive organ has to the parts which exercise the other vital functions, is supposed almost self-evident; and is conformable to the common notion and opinion in regard to the power of the mind in different individuals of the human kind. It is, however, to be observed, it is said, that some differences must arise from the age and the degree of fatness of an animal, which cannot be imagined to materially affect the mental powers, though they may that of the weight of the body. But a more precise and exact method of ascertaining this is that, by comparing the weight of the cerebrum with that of the cerebellum. In some of the inferior classes of animals, the diminution of the cerebrum in proportion to the cerebellum, is noticed to be very striking, and to form a very correct index of the gradations of intellect in them. But in order to fix the proportion of the mental state or capacity in animals of this and some other kinds, it is probably the most to be depended upon to compare the amount of the brain with that of the *medulla oblongata*, or the nerves that take their rise in the cranium; which may be effected in the manner that has been done by Ebel and Soemmering, by simply measuring the diameters of the different nerves at their thickest parts.

It has been well suggested, however, that "in judging of the capacities of animals, we should carefully distinguish between the operations of intellect and of instinct." These are supposed to be frequently mistaken for each other in animals; and are, it is believed, more often confounded in the thinkings and actions of the human mind than we are generally aware of in such cases. It is well stated, that "the brain is the seat of reflection and of *ideal* knowledge;" and that, "the nerves and organs of sense are but its agents;" that they are "wholly incapable of performing any intellectual operation of themselves." "That the perfection of the organs or parts of sensation, however, determine, in a great degree, the *instinctive* faculties of animals, independently of the influence of the brain. Indeed, the intellectual and instinctive powers are found, like

	Inguinal.	*Abdominal.*	*Pectoral.*
In the *mare*, *sheep*, and *goat*,	2		
In the *deer*,	4		
In the *sow*,		10	
In the *bitch*, *rabbit*, and *hare*,		6	4
In the *cat*,		4	4

the organs upon which they depend, to exist in an inverse ratio to each other." That "man, who has the highest mental character, has the brain largest, and the nerves smallest in relation to each other; and that in the inferior classes of animals, whose actions are almost entirely governed and directed by instinct, the nerves are uncommonly large, and the brain proportionately small; and even, in some kinds, hardly distinguishable."

There is a difficulty in ascertaining the exact proportion which the brain bears to that of the rest of the body, in consequence of the different states of fatness and leanness in the animals; but taking these circumstances very generally, small animals are found to have the brain proportionately the largest.

The largest brain in the *horse* was found by Soemmering of the weight of 1 lb. 4 oz., while that of the smallest in the human subject was 2 lbs. 5½ oz. And others, as Dr. Monroe, are stated to have found the weight of the brain in the *ox* to be only one fourth of that of the human one; while the weight of the body in the former was six times greater than that of the latter; or that, the human brain is twenty-four times more in proportion to the weight of the body, than that of the *ox*.

In *man*, the weight of the brain varies at different periods from a twenty-second in youth to a thirty-fifth of that of the body in a person advanced in life. The weight of this viscus is very various in different animals of the domestic as well as other kinds*.

The proportion which the cerebellum bears to that of the cerebrum or brain, is equally various in different sorts of animals of the domestic and other descriptions †.

The proportional width or breadth of the substance of the brain to that of the medulla

* The proportionate size of the brain to that of the whole body, in different animals of the cattle, and some other kinds, are these, as taken from the tables of Cuvier:—

	Proportions.
In *man*, as he is young or aged,	1-22, 1-25, 1-30, 1-85
In the *ox*,	1-800
—— *calf*,	1-210
—— *sheep*,	1-381, 1-192
—— *deer*,	1-200
—— *horse*,	1-400
—— *ass*,	1-254
—— *wild boar*,	1-072
—— *domestic hog*,	1-312
—— *hare*,	1-228
—— *rabbit*,	1-40, 1-52
—— *dog*,	1-47, 1-30, 1-37, 1-134, 1-101, 1-305
—— *cat*,	1-82, 1-94, 1-156

† In some animals, the proportions are these, as extracted from the same tables:—

In *man*, as	1 to 9
In the *ox*,	1 — 9
—— *sheep*,	1 — 5
—— *horse*,	1 — 7
—— *wild boar*,	1 — 7
—— *dog*,	1 — 8
—— *cat*,	1 — 6

oblongata is, with very few exceptions, the largest in the human subject*.

There are differences, too, in the brain of this kind of animals from that in the human subject, the superior surface of it in them is considerably more flat, and the whole has much more of the oval form. The middle, and especially the lateral lobes of it are less prominent, particularly on the inferior surface of them; and there is wholly a want of the posterior ones, so that the cerebellum is not covered by the cerebrum. The middle lobes of the cerebellum, too, are proportionately larger than the lateral ones; and the divisions of the exterior surface of the substance of the brain in the convoluted manner are rather less deep, though somewhat numerous. There is less inequality in the lower surface of the brain, there not being so much projection in the different prominences of it.

The cerebellum is distinguished by transverse fissures, which divide it into lobules that form convolutions in some measure as in the cerebrum; the middle lobes being proportionally large.

The extent of the lateral ventricles of the brain in these animals are less than in man, the portion termed *posterior horn* or *digital* cavity being wanting. The parts named cornua ammonis, are large in proportion, but less prominent on the surface portion †.

The olfactory nerves in these quadrupeds are very large in size, and comprise a cavity which communicates with the lateral ventricles: they are constituted externally of a cineritious material, and internally of a medullary one; and are found of the largest size in animals of this kind.

The tubercula quadrigemina are large in these animals, and in them the parts termed nates or the superior tubercles, are much larger than the testes or the inferior ones, and of a roundish form.

The existence and structure of the pineal gland have not been well ascertained; but the presence of it, as well as the earthy or gritty nature of its composition, may be presumed to be general, in consequence of being discovered in some particular sorts of animals which have

* The relative breadth between the *medulla oblongata* on the back of the *pons* varolii, and that of the brain, is that as given below from the same tables, in some of the different sorts of domesticated and other animals:—

In *man*, it is as . . .	1 to 7
In the *ox*, as	5 — 13
—— *calf*, ...	2 — 5
—— *ram*, ...	5 — 7
—— *deer*, ...	2 — 5
—— *horse*, ...	8 — 21
—— *hog*, ...	5 — 7
—— *rabbit*, ...	3 — 8
or, . . .	1 — 3
—— *dog*, ...	6 — 11
or, . . .	3 — 8
—— *cat*, ...	8 — 22

† In the *ox*, the *sheep*, and the *horse*, the third ventricle makes a sort of circular passage, which surrounds the *commissura mollis* of the optic *thalami*. In the fourth ventricle there is not any thing extraordinary; but the *arbor vitæ* in the substance of the *cerebellum* has much resemblance to that in the brain of the human subject.

but little relation in their structure to that of man*.

The inequalities at the base part of the brain are a great deal less than in the human subject; and the tuber annulare is far less prominent. There is likewise only a single eminence of the corpus albicantia kind in these animals, and the corpora pyramidalia are of more length.

The *tentorium cerebelli* has proportionally more breadth than in man; but it is differently formed in other sorts of animals†.

The *falx* of the dura mater, which divides the hemispheres of the brain, is less in size in proportion than in the human subject, which may render the danger of their injuring each other less.

The cortical and medullary portions of the brain have much similarity to those in man. The parts termed corpus callosum, corpora striata, and fornix, have merely a slight variation in their breadths, the last mostly covering a large portion of the optic thalami.

In the membranes of the brain there is nothing further of particular use or importance; and the blood-vessels of it have already been described and explained.

NERVES.

In the distribution of the nerves in these animals, there is a very close and intimate resemblance to that which takes place in the human subject. They may be divided and arranged into two kinds, as those which arise immediately from the brain itself, and those which originate from the spinal marrow.

CEREBRAL NERVES.

In the origin of these within the cranium, there is nothing extraordinary except in the first or olfactory pair, which are large hollow processes of the anterior lobes of the cerebrum, the cavities of which, as has been seen, communicate with the lateral ventricles of that organ. They form in these animals two large prominences which have long had the title of *processus mammillares*, and which are mostly of a cineritious quality, filling up the ethmoidal fossa, and causing an increased number of ventricles in them. By being thus constructed, there is not apparently much effect however produced upon them after having passed the ethmoidal bone into the cavity of the nose; but they are strong and easily seen in these large animals. From these there are many fibrillæ coming off, to be distributed over various parts in the higher portion of the nasal cavity‡.

The optic or *second* pair of nerves have a perfect similarity in their structure to those in man previously to their passing into the ball of the eye; but the medullary tubes of which they are constituted are more full and conspicuous, being more intimately conjoined. The fibrillæ, of which they are composed, are so much separated by the pia mater in these animals, that when cleared and inflated, they have the appearance of distinct canals.

* This sort of terrene constitution of this body has been discovered in the *cervus dama* or fallow deer, by Soemmering; and likewise in the *goat* by Malacarne.

† In some, it is sustained by a thin plate of bone, which projects from the inner surface of the *cranium*, in one or in three portions. The former is the case in the *cat*, the latter in those of the *horse* and *dog*. In the first it is an uniform bony partition that leaves a quadrangular opening in the lower part of the *cranium*.

‡ In the *sheep*, there is likewise a branch, taking its rise within the *cranium*, from the upper portion of the trunk of the same nerve.

In the *third* and *fourth* pair of nerves, there is nothing particular in these animals.

In the *fifth* pair, there is, however, a slight difference in the ramifications and ganglia which are formed; though the distribution of it is very similar to that in man*.

* The description, as below, has been given by Cuvier, of the *three principal branches* of this pair of nerves, as taken from dissections of the *calf*, *sheep*, *rabbit*, and *dog*.

The first, or *ophthalmic* branch of this pair, from this account, is divided within the *cranium*, but does not form and send off its three branches until it reaches the orbit of the eye. The first of them, which is analogous to the nasal branch of the ophthalmic, is the largest. It branches out into five or six small nerves; some of which pass through the vault of the orbit to the frontal sinuses: others, which are larger, enter the nasal cavity by the internal orbit or *foramen*. They ascend in an osseous canal, and pass into the *cranium* by the large *foramina* of the cribriform bone, and pass down again through the ethmoidal *foramina*, to be distributed to the pituitary membrane of the nose, as in man. These branches are very plainly seen and easily traced in this kind of large animals; but one of them would seem here to have been mistaken in the *sheep*, for a branch of the olfactory. One or two of the branches into which the nasal divides, go to the *levator palpebræ superioris* muscle. One of these twigs assists in forming the *lenticular ganglion*, which, in the *dog*, gives off two *ciliary* nerves that divide before they enter the eye; and, in the calf, it sends off four nerves of the same sort. Lastly, the nasal sends filaments to the *obliquus inferior* muscle, and the *glandula Harderi*.

Next, the *frontal*, or *second*, branch of the *ophthalmic*, is seated superiorly under the roof of the orbit. It divides into two nerves; one of which is external, and furnishes two filaments to the *rectus superior*, and the *levator palpebræ* muscles; the other, which is internal, supplies the internal straight muscle of the eye, and gives off the frontal branch which passes through the superciliary notch, to be distributed to the integuments of the forehead.

The *lacrymal*, or *third*, branch of the *ophthalmic*, furnishes a great number of filaments, which are expended upon the *lacrymal* gland. The *second* branch of the *fifth pair*, or the *superior maxillary* nerve, when it reaches the outside of the cavity of the *cranium*, becomes considerably enlarged. Its fibres appear to decussate each other in such a manner, that the two branches, which it soon after forms, seem to be produced by opposite filaments: thus, the posterior, or sub-maxillary branch would appear to be formed and composed of the anterior filaments, and the anterior, or *supra maxillary* branch of the posterior fibres. This disposition is found to be very evidently marked in the *dog*, but less so in the case of the *calf*.

The *supra maxillary* branch proceeds nearly in a horizontal manner from behind forwards. And which, after having reached the anterior and inferior parts of the temporal *fossa*, divides into a great number of *fasciculi;* of which, one bundle, which consists of four or five filaments, proceeds onwards towards the *spheno-palatine foramen*. This *fasciculus* then divides into two; one branch of which is sent into the nasal cavity, and furnishes a considerable nerve, which is spread out upon the fleshy substance of the palate. In some cases, as in the *calf*, this branch separates from the trunk, even before it enters the spheno-palatine hole.

The other branch of the *superior maxillary* nerve, which also enters by the spheno-palatine hole, passes into the body of the superior maxillary bone, detaches filaments to all the teeth, and goes out by the sub-orbitar *foramen*, where it expands and separates into a great number of branches, which supply the muscles and integuments of the face, and anastomose with the branches of the facial nerve; but it is larger in some other sorts of animals than these. There are some further filaments given off from the superior maxillary nerve. The first is but small, which, after anastomosing with a ganglion, passes into the substance of the temporal muscle, to which it gives branches. Afterwards it perforates the orbit, and from thence passes into the nose. Another still more remarkable filament arises from the spheno-palatine branch; and which then forms a ganglion, that is joined by the preceding nerve, in the manner just noticed, and different other smaller branches. A nerve which is flat proceeds from this ganglion, which would seem to be the continuation of the nerve that formed it, though larger in size. It passes between the palatine and the convexity of the pterygoid process, in the substance of the bone: among other branches it sends one down to the floor or surface part of the nostrils.

The *third*, or *inferior*, *maxillary* branch of the *fifth* pair, gives off very soon after its separation a tolerably large branch, which is distributed to the parotid and maxillary glands. It then divides into two other branches, one of which is internal, and is lost in several small filaments, in the muscles, and likewise in substance of the tongue; the other, which is external, sends many branches to the pterygoid muscles and those of the cheeks and lips, in their passage to the skin of the face,

The *sixth* pair is in a soaked bloody state, and before passing out of the cavernous sinus, become connected by one, two, or more branches with that of the great sympathetic nerve.

The *seventh* pair divides as in man, into the *portio dura*, and *portio mollis*. The former or *facial* nerve, is described to arise in the *calf* of these animals by two roots; the one, the real portio dura; the other, apparently, proceeding from a considerable ganglion of the posterior part of the *par vagum*, which is placed in a particular depression of the inferior surface of the bone of the *tympanum:* this root, too, would seem to unite with the great sympathetic nerve, which has nearly the firmness of that of cartilage. There are two or three short filaments likewise concurring in the formation of this root. Afterwards it becomes more thick, and passes into the *fissura Glasseri*, to meet other roots of the facial nerve, to which it transmits a filament, and continues to pass outwards before and below the ear.

In animals of this kind, as having large ears, that branch of the facial nerve which unites with the first cervical pair is of a large size.

In the *portio mollis* of the *seventh* pair, or the true *auditory* nerve, there is little that is peculiar to be noticed in regard to it. In the dissections which have been made of the *calf*, *hog*, and *dog*, for the *par vagum* or *pneumo-gastric* nerve; it has been found in all of them, that the distribution and ramification of it have borne the greatest resemblance possible to that of the same nerve in the human subject.

In the *glosso-pharyngeal*, and in the *hypoglossal*, nerves, so far as they have yet been examined, there has not appeared any deviation in these animals from that of their disposition in the human body. The latter, in the *calf*, has been found to have a bluish cast until it arrives on the outside of the *ramus* of the lower jaw.

SPINE AND VERTEBRAL NERVES.

The spine is lined with a marrow, which is covered and incased by the same membranes, and divided into two sorts of lateral cords, in much the same manner as in the human subject. This last is indeed more distinctly marked in these animals than in man. The amount of the nerves that come off from these lateral portions, or the spinal marrow, is in exact proportion to that of the holes or openings between the different vertebræ; and they take their rise with much similarity to those in man.

There are seven cervical nerves on each side that part, in addition to the occipital and the

where they are lost, in anastomosing with the other facial nerves. The continuation of the *superior maxillary* nerve passes, as usual, into the canal of the lower jaw, supplies the teeth, and then emerging at the *foramen mentale*, spreads in branches upon the soft neighbouring parts.

In the *calf*, the *superior maxillary* nerve, soon after leaving the *cranium*, separates into four branches. The most posterior of which goes backwards and below the condyle of the jaw, where it forms two branches; one, which is slender, enters the parotid gland, to which it gives filaments that anastomose with those of the facial nerve: the other, which takes the circuit of the jaw, advances into the front part of the mouth; it unites, as it passes along the cheek, with the middle branch of the facial nerve, from which it previously receives different anastomosing branches.

The *next* branch of the above four is very long and slender, following the *ramus* of the jaw to be expended upon the buccinator muscle and the glands.

The *third* branch of the four passes into the dental canal, and supplies the teeth in the manner that is usual in the human subject.

And the *last* or *fourth* branch, is the lingual; it is of much strength and flat, terminating in radiated filaments in this part.

accessary ones, which are here large and strong, from the nature of the parts which they supply. The brachial *plexus* is the production of the three last nerves of the neck, and that of the first of the back. They consist of several large trunks, so disposed as to suit the nature, size, and shape, of the anterior extremity in these animals.

The *diaphragmatic* and *phrenic* nerves are very similar in their structure and distribution to those in man.

The *intercostal* or *great sympathetic* nerve, which has been found in some cases, though not in these, to form a very singular anastomosis with the fifth and sixth pairs, from the dissections of the *calf* and the *sheep*, has been thus described by Cuvier: That on entering the cranium through the *foramen lacerum*, it becomes distinct from the *par vagum*, and cleaves in a very close manner to the periosteum of the temporal bone: That if the cord of the nerve be stretched, it is seen to be divided into six or seven filamentous parts, which form a close sort of net-work: That, a few lines farther on, these filamentous threads approach each other, and become consolidated into a ganglion, which from its great firmness has an appearance similar to cartilage: That there are many filaments departing from this ganglion; some of which are but short, and go to the nerve of the fifth pair; that others which are long and small, are interwoven with the blood-vessels, in such a manner as to form a reddish-coloured *plexus*, which was imagined by Willis to be a little *rete mirabile:* That the communication with the sixth pair is formed by means of this plexus, which surrounds the nerve on every side, and is scarcely to be separated from it.

The *great intercostal* nerve, while passing through the *foramen lacerum*, sends off a filament to the cavity of the *tympanum*, where it is likewise united with the eighth pair.

The *cervical superior ganglion* takes its formation some lines from the *cranium;* having a reddish colour, and an oval, elongated form. It makes a similar communication with the adjoining parts, as in the human subject.

The *intercostal* nerve in the fore part of the last *cervical* vertebra, forms a curve from within outwards, towards the first rib, on the head of which it joins the first thoracic ganglion. There are several filaments from this curve which pass along the *mediastinum* to the *pericardium;* and others which form a *plexus* around the subclarian artery.

The *first* of the *thoracic ganglia* has a semilunar form; from one of the edges of which some filaments pass off; the uppermost of them being sent to the vertebral artery, around which it forms a *plexus*, appearing to accompany that vessel into the *cranium*. The other filaments unite with the last cervical, and with the two first dorsal pairs of nerves. The concave edge of this ganglion sends off two or three filaments, which descend in an oblique manner to the roots of the pulmonary arteries, where they unite with the *par vagum*, to form the *pulmonary* and *inferior cardiac plexuses* of nerves.

In its passage through the thorax, the intercostal produces a ganglion upon the head of each rib, which is joined by a filament from each of the dorsal nerves. On entering the abdomen, it forms a single cord, which is the *splanchnic* nerve. It then passes into the middle, under the stomach, where it commonly separates into two cords, which afterwards become again united. In consequence of this sort of ring being formed, there arises either a main trunk or four or five filaments, which, uniting near the cœliac artery, form a ganglion

that is usually of a semilunar shape. The filaments which constitute the *stomachic, splenic,* and *hepatic plexuses*, arise from this semilunar ganglion, and answer to the *solar plexus*. Filaments are likewise detached to form the *renal plexus*.

As it proceeds along the lateral parts of the bodies of the vertebræ, the *intercostal*, too, gives rise to *ganglia* of a quadrangular, elongated form: one of the superior angles of which receives the continued trunk of the nerve; while the internal inferior angle sends a branch to the aorta, to join in the forming of plexuses, that encompass each of the branches of that vessel. The continuation of the trunk is furnished by the external inferior angle. In most other respects, this large nerve is very similar to that in man.

The nerves of the *thoracic* cavity are furnished and supplied by the axillary *plexus*.

Nearly about the middle of its course, the *medium* nerve sends off a branch, which is analogous to the *external cutaneous* nerves.

The *dorsal* and *lumbar* nerves are different from those in the human subject, chiefly in what regards their numbers, which are capable of being determined by that of the vertebræ.

The *pelvic* nerves have likewise the same similarity to those in man.

But the *caudal* nerves, or those which supply the tail of these animals, are material to be known, as they are not met with in the human subject. These proceed in them from the canal of the lower part of the spine, by the different *foramina* between the primary pieces of the *caudal vertebræ*, in order to be distributed upon the parts at the root of the tail, and upon the continuation of the substance of that part*.

In the distribution of the nerves of the different extremities in these animals, there is but little peculiarity which is worthy of notice†.

In the *anterior* extremity, about the middle of the arm or fore leg part, the *ulnar* nerve gives off a branch that would seem to take the place of the *internal cutaneous* one: it supplies the extensor muscles of the elbow and the skin.

In the *posterior* extremity, the nerves form a *plexus*, of which the several cords and the distribution of them is nearly the same as in man.

SECTION 11.—*Different organs and parts engaged in performing various important functions.*

These are of many different kinds, some of which are much more limited in their nature than others, and all of them a great deal more so than in the human subject.

* In the *rabbit*, the description as below has been given by Cuvier, from his dissection of that animal. The *first pair* of caudal nerves comes out between the last piece of the *sacrum* and the first *vertebra* of the tail, and takes its course by the *ischiatic* notch. It divides into two branches, one of which is united to the *schiatic* nerve, and the other continues to proceed between the *pelvis* and the tail, until it enters a gland which is situated under the sixth pair of caudal nerves, where this branch terminates: but in its way thither it forms different anastomoses with the other caudal nerves, and gives off branches, by which there is a remarkable *plexus* formed, which by the above writer is termed the *caudal*.

The first branch which is sent off by this nerve is distributed amongst the gluteal muscles. Afterwards the nerve is joined on the inner side by a small filament that would seem to be derived from the second pair of caudal nerves, and on the outer side by three or four filaments, which make a *plexus*, from whence several branches proceed to the muscles; one, which is very considerable, and easily traced, is sent to the *penis*. Afterwards the third, fourth, and fifth pair of caudal nerves send filaments to the inner side of the branch of the first pair: then five or six branches are given off from the external side of the muscles of the penis, and those which arise from the *ischium*. And lastly, the trunk of the first caudal pair terminates in the gland, as already stated.

† In the *rabbit*, the *articular* nerve is altogether formed by the fifth cervical pair of nerves; there being only one of its filaments derived from the *axillary plexus*.

ORGANS AND PARTS OF TOUCH.

The surface part of the body in these animals is in many respects well suited for receiving external impressions, as being extensive and well furnished and provided with nerves, with a thin exterior cuticular covering rather distantly set with the bulbs or roots of hair. These circumstances all contributing to facilitate rather than impede the sense of touch.

The cuticle or external part of the skin has the structure of it rather similar to that in man; but it is somewhat less delicate than in many other kinds of quadrupeds, being a little hard and thick in particular parts, but varying much in different breeds and kinds of these animals. But the cutis or true skin is still more variable than that of the cuticle, but is always the thickest and least sensible on the back and the outside parts of the limbs. The colouring material, which is placed between these skinny layers, has been termed the *rete mucosum*, and is very thin and light in its cast in those parts which are much covered with hair. In the mouth and the cavity of the nose, however, the colour often inclines to a darkish tint.

In the lips of these animals there is a nice sense of touch in consequence of their being largely furnished with nerves and blood-vessels and the papillæ of the skin of the parts being considerably prominent. The skin in all cases is thickened by pressure, and the sensibility of it thereby much lessened*. There are particular parts of some animals that are extremely well suited for feeling with, from their being elastic and moveable, and the extremities of them having a papillated surface in the manner of a lip, which is richly provided and spread with nerves and vessels†. External impressions are in these and some other animals, conducted to them through the medium of the insensible parts which they possess, as in the cases of the hoofs and horns, which are so closely connected with parts that are so acutely sensible, that the slightest impression upon them in the uncovered state would become, in the highest degree, painful. But it has been well noticed, that the "vascular and sensible substances, which are found clothed by these horny integuments, are better calculated for producing the perception of the mere existence of solid or resisting bodies, than any of the other organs of touch; but are incapable of furnishing any idea of the figure of foreign substances."

These are most of the principal circumstances which regard the sense of touch in these animals.

ORGANS AND PARTS OF TASTE.

The tongue is commonly believed to be the part in which the sense of taste wholly resides; but there are matters and bodies which cause particular sensations of taste in passing over the insides of the lip parts, as well as those of the fauces. In these, and some other sorts of quadrupeds, the very irregular denticulated folds, which are formed by the lips, would appear to be particularly well suited for the reception of the impressions of substances of the sapid kind. Instances have happened,

* The thickness of the skin is capable of being increased to a very extraordinary degree in some cases by means of artificial pressure. This is very evident in *boar-hogs*, which are used for making *brawn*, as in these cases the skin upon the shoulder parts is sometimes rendered more than an inch thick.

† This is the case with the snout in the *hog*.

where the tongue was wanting, yet there was the capability of discovering the taste of sapid matters when passing over the palate. It is simply by the peculiar organization of the integuments of the tongue that the sense of tasting is possessed by animals. The tongue is long in its form in these animals, having the three sorts of *papillæ* upon it, namely, the *conical, fungiform* and *incupped;* and the anterior half of it, or thereabouts, is covered with conical papillæ, which terminate in flexible horny filaments, that are bent backwards, and end in a point.

The posterior, or back part of the same organ, is covered by thick tuberculated papillæ, which are either cone-shaped or semi-spherical, and which become smaller towards the side parts. There are, likewise, other sorts of these *papillæ* numerously situated on the sides of the back part of the tongue*, but not very easily distinguished from those of the *fungiform* kind in these beasts.

These are the principal means by which the sense of taste in these, as well as many other sorts of animals, are produced.

ORGANS AND PARTS CONCERNED IN SMELLING.

The apparatus and means of gaining the impressions of different odorous effluvia, is for the most part considerably more complicated in these animals than in man, which is consistent with the great excellence of the power and sense of smelling in them. The different *foramina* of the cribriform plate through which the branches of the olfactory nerves pass, seem to be more numerous in proportion to the perfection of the sense of smelling. In these animals, the foramina of this bony plate are rather large, and somewhat collected together†. The ethmoidal cells have been described as a numerous sort of hollow pedicles that are all connected to the cribriform bone; extending in a forward and outward manner, and as they advance, those which are the nearest each other unite. There are vesicles arising from them, which increase in size in proportion as they become less in number: they are all hollow, and there are a vast number of conduits and passages between them, each of which communicates with the other. These cells are different in some cases‡.

* In the *hog*, the tongue is short, with the edge divided into a number of processes like fringe.

The conical *papillæ* are very small and compact in the *horse*, and the *fungiform papillæ* are confined to the sides of the tongue; and there are but three of the *incupped papillæ*, the surface of which is irregularly tuberculated.

In the *cat* kind, the conical *papillæ*, that are on the middle of the tongue, are clothed with horny integuments. These are a sort of little hooks or claws, which are sharp-pointed, and when on the tongue, are inflected backwards; so that in the case of any of the larger animals of this sort employing the tongue in licking the human hand, they are liable to tear off the skin. When the *papillæ* of the tongue are covered by a horny matter they appear to be insensible to the impressions of sapid bodies; soft round papillæ are therefore found in the *cat* kind, interposed between the horny ones upon the middle of the tongue. These two kinds of *papillæ* are placed alternately in a sort of quincunx order, so that there is an equal number of each upon the tongue. There are soft conical fungiform *papillæ*, too, upon the edges of the tongue. But upon the back part of it the horny *papillæ* disappear; while there are some incupped *papillæ* arranged in two lines, which approach posteriorly. It has been found, too, that there are on the sides of the back part of the tongue, in the *common cat*, some *fungiform papillæ* that are pendent from long pedicles.

† In the *sheep* and the *hog*, there is a row of larger holes on each side of the *crista-galli* of the ethmoid bone.

‡ They are separated from the rest of the nasal cavity by a particular *septum* in the case of the *hog*, where it is produced by a plate of palatine bones interiorly, and anteriorly by a process of the maxillary bones. It extends to the *septum nasi*, and leaves only a narrow passage above it.

The *superior turbinated* or spongy bone, is formed in each side by one of the ethmoidal cells in this sort of animal. This cell is larger and of much more length than the rest, extending as far as the inferior turbinated or spongy bone, which is covered by it in somewhat the manner of tiles on a roof. These bones commence, each as a single *lamina*, that soon forms two, which are coiled upon themselves in a sort of spiral manner, and make about two turns, in such a way as to produce a kind of horn or *concha*, closed posteriorly in a sort of point. This horn contains two canals; the one of which is above, the other below the main *lamina*. The superior canal leads to the maxillary sinus, and the inferior one of the *concha* directs into the back of the nasal cavity as in man*. The laminæ of the turbinated bones are porous, or filled with holes or *foramina*, that are somewhat large, which renders them light and open. The *hog*, however, is without foramina in these bones. In the internal part, the turbinated bone has different partitions, which are perforated with vacancies, and a sort of open work formed†.

The *inferior turbinated* bones are more complicated in their nature here than in man.

In these animals, the *conchæ*, or *ossa spongiosa*, being so much convoluted, afford a more extended surface for the expansion of the *membrana pituitaria*, and the dispersion of the olfactory nerves, which tend greatly to the increase of the power of smell; hence, animals of this kind, are found to possess great acuteness in this sense. The distribution of the olfactory nerve, on its reaching the nasal cavity in these animals, has much similarity to what takes place in man.

The nose is somewhat similar in its connexion and communication with the fauces, and in directing and conveying the air to the lungs to what happens in the human subject; but varies in the form and size, as well as in the nature of the *sinuses* and *laminæ*, which enlarge the extent of its cavity, and the parts by which the opening of it is covered.

The several sinuses in the different bones that are about the nasal cavity, and especially the *frontal* ones, have been supposed by some, as being necessary, and assistant to, the organs and parts of smelling; but, it has been well suggested, that the use of them has not yet been fully decided. That the membrane which lines them is not organized for the reception of the impression of odorous effluvia, and that the retention of the latter in their cavities, is not likely to be the cause of much effect upon the pituitary membrane. That it may be observed, that when animals are desirous of smelling any substance in a particular manner, they make that sort of short inspirations, which is termed *snuffing*. That the principal use of the sinuses, as they relate to, and are connected with, the organs and parts of smelling, seems to be that of supplying "a clear watery fluid" for preserving those parts in a moist state, which are in fact the true seat of this sense, for it is found, that when the secretion of the sinuses

* In the *hog*, the superior canal is continued posteriorly in a long groove which ends in a canal that goes into the *malar sinus*.

† In the *dog*, *hare*, and *cat*, the inferior turbinated or spongy bone is in a high degree complicated; having the first *lamina* forked, and each branch in a state of subdivision; the last, forming a number of parallel canals for the purpose of the passage of the air, and that of the suitable distribution of the nerves.

There is much variation in the number of *laminæ* in the inferior *conchæ*. They are rather numerous in the *dog*, and least in the *hare* and *rabbit*.

becomes in a suppressed or inspissated state, in consequence of inflammatory colds, the sense of smelling is greatly lessened and injured.

There is much variation in the form and size of the *frontal sinuses*, but in these animals they are considerably large, extending into the interior of the osseous process, which sustains the horn*. In these beasts, too, the *maxillary sinuses* are very large. Each of which opens, by means of a narrow slit into the cavity of the nose, behind the inferior turbinated or spongy bone; but in some other cases they are either small or wholly wanting, and sometimes more in number†.

The *sphenoidal* sinuses, though they must, from the position of the head in these kinds of animals, tend to perform the same use as those of the *frontal* ones, are not answerable in size to the latter; they are, however, found in some animals‡.

The entrance or passage into the parts and organs of smelling, is constituted in its cartilages and other parts in rather a similar manner to those in man, but they differ in their form and size. In these animals, the osseous *nares* are large, and are notched in their lateral parts. The soft portion of the nose, which is connected with the bones, composes the nostrils properly so termed, the edges of which are cartilaginous. The other is external, and a skinny fold, which forms a cavity that has the name of false nostrils, and has the same common opening with that of the internal ones§.

In its general structure, the pituitary membrane which lines these parts corresponds with that in man: and on its surface part there are numerous pores, from which a mucus constantly exudes that preserves the parts in a moist and fit state for receiving the impressions of smelling bodies. In these ways the different parts are formed, and contribute to serve the purpose of smelling in these animals.

All the other parts which contribute to form and perfect these organs have been already spoken of in their proper places.

* In the *sheep* and the *goat*, they are similar in their size and extent in proportion to that of the animals, as well as in the other respects.

In the *hog*, these sinuses are particularly large, extending as far as the occiput; and are divided by some *laminæ* of bone, but are without the intimate cellular structure.

In the *horse*, they are of a tolerable extent, but are confined to the frontal bone, stretching through a large proportion of it; yet instead of opening directly, as is usual, into the upper part of the nasal space, they communicate on each side, by a large aperture, with the posterior maxillary sinuses.

The *stag* is thought to want the *frontal* sinuses. And in the *deer*, there are scarcely any of these sinuses: but they have cells of the membranous kind seated between the nose and the internal angle of the eye.

† In the *hog*, they are not found, but their place is supplied by sinuses in the base parts of the *os malæ* or cheek bones

In the *horse*, there are two *maxillary sinuses* of a large size on each side, the one posterior to the other. The latter of which is the larger, and projects into the nose, into which, each opens by a separate passage.

‡ They exist in the *hog*, but are only of a small size. And are present in the *horse*, in which animal they open into the posterior maxillary *sinuses* or cavities.

§ In the *horse*, a large portion of the external *nares* is membranous; the edge of the nostrils containing a cartilage of the *semilunar* kind, that agrees with that of the inferior one in the human subject. It consists of two branches, one of which is long and narrow, being nearly parallel to the *septum;* the other is short, almost square, and situated in the external *ala* of the nose. The remainder of this part is formed by the integuments, which are primarily inflected for the purpose of producing a *fossa* that is distinguished and known by the title of false *naris* or nostril; the passage into the true *nares* being that of a long sort of slit.

ORGANS AND PARTS OF HEARING.

In these animals, the *concha* and cartilaginous part or *meatus auditorius,* which form and constitute the external portion of the ear, or that which is projecting, and serves to collect and convey the sound to the other parts, is large, and somewhat erect, as they have the necessity of gathering it from distant quarters through the medium of the air; but it is different in some other animals*. The cartilaginous meatus auditorius is composed of three pieces, the first of which is joined with the concha; the second is a tube which is united to the bony meatus by means of ligament; and the third is a cartilage, to which there is nothing similar in the human ear. The two first pieces have each a longitudinal fissure; and the last is flat, but makes no part of the concavity of the ear, being situated above the cartilaginous meatus, merely serving for the attachment of certain muscles. It varies in shape in other animals, and has the term of *scutum*†.

The muscles which move the external ear are several in number, and considerably complicated. They have been already described‡.

The meatus auditorius in these animals is osseous at its inner part, but it is wide and rather long, and passes directly inwards. In the *horse,* however, it goes downwards and backwards.

There is a rather extensive *membrana tympani,* as the sense of hearing is here somewhat acute; and which is placed, in some measure, in an oblique rather upright manner, which is likewise favourable for the purpose; but in some other sorts of animals it is both seated differently, and has a different direction§.

In its form, which depends on the frame of bone in which it is fixed, it is that of a sort of oval, having its great axis descending slantingly forwards in something of the infundibular manner, and the anterior arch of it less convex than the posterior. It is in its intimate structure the same in these and other quadrupeds, being formed of three coats or layers, the middlemost of which is muscular.

The tympanum in its size and form is somewhat large and a sort of oval angular, making an extended opening or cavity, which is dilated at the lower part on each side into a kind of half oval cell; that of the different sides producing two risings which are evident on the inferior part of the skull‖. The place of the mastoid process seems to be supplied in this manner; but there is a sort of styloid process of the occipital bone, which some have considered as having a kind of similarity to the mastoid process¶.

The Eustachian tube in these animals has

* It is the same in the *horse, ass, mule, rabbit,* and *hare;* and in such animals as are fugitive, the concavity of the *concha* is commonly turned backwards; while in those that seek for their food, it is for the most part directed forwards. In some, too, the superior portion of the *concha* has a downward turn, as in the *sheep* and *hog.* Slouching ears are probably a mark of domestication.

† It is triangular in the *horse.* The *sheep* has it lunated. In the rabbit, it is pointed posteriorly, and behind bilobed. In the *dog,* rhomboidal.

‡ In the *horse, sheep,* and *dog,* they are from that of a dozen to twenty in each ear, which enables the animal to move it in almost every possible direction, and to turn it upon its axis without the head being moved, as they are fixed to almost every part of the *concha.*

§ In the *rabbit, hare,* and some *large* animals, it is nearly vertical, and turned towards the side.

‖ In the *dog* and *cat,* this is globose in its figure.

¶ This is the case in the *hog,* too, and probably in other animals. Sometimes the interior of the cavity of the *tympanum* is divided into different parts. There is, too, in some cases, a sort of transverse osseous process or part

much similarity in the structure and openings of it as in the human subject*. The two *foramina* which unite the opening or cavity of the tympanum are so greatly various in their form, that they have now been termed *fenestra cochlearis* and *fenestra vestibularis*, instead of *foramen rotundum* and *foramen ovale*. In the *calf* and the *hog*, the *fenestra cochlearis* is twice the size of that of the oval fenestra or foramen†. The *ossicula auditus* are almost wholly the same as in man‡. There is but little variation in the form of the *incus* or *stapes* from that of those in man. The muscles, too, are much the same, but they have not perhaps been fully investigated in either case.

The *labyrinth* of the ear, which consists of the same parts, is very similar in most other respects with the same parts in the human body.

The *cochlea* has a turbinated structure, and is somewhat large, forming two and a half turns, as in man§.

There is in the scala tympani, in some cases, a small canal, which has the same curvature from one end to the other of the cochlea, having the appearance of being a third scala to it, but which varies in the circumstances of its size, increasing as it proceeds in the cochlea, it being the widest at the point. There is said to be in these animals a somewhat similar but much smaller canal. That part of the lamina spiralis which touches the axis of the cochlea is osseous, as in the human subject‖. The passages which have been termed aqueducts are here rather large too. The vessels and nerves of the ear are similar to those in man, the portis mollis and dura passing into the meatus internus, and entering the labyrinth by different holes.

These are the nature, structure, and arrangements, of the different parts by which the hearing is effected in these sorts of animals.

ORGANS AND PARTS CONCERNED IN VISION.

The eyes in these animals are placed somewhat laterally and distantly in the fore part of the head, and are formed and constituted of the same number of coats, and the same humours as in man. The form of the ball of the eye is somewhat globular, but rather inclined

* In the *horse*, there is a large sort of membranous *sac* only in the back part of the mouth, in which the *Eustachian tube*, or trumpet, terminates.

† In the *cat*, the osseous part of the *Eustachian tube* is somewhat a narrow fissure rather than a canal. In the *horse*, the vestibular fenestra or foramen is the larger of the two.

‡ In the *dog* and *cat*, the *processus gracilis* of the *malleus* is formed into a thin *lamina* at its extremity, the short process of it being very prominent; and there is another process at the inner part of the neck of the *ossiculum*, which answers the intention of the small spine in the human ear.

§ In many cases the *cochlea* is larger in proportion to the semicircular canals than in man. It is so in the *horse* and *hog*; while, on the contrary, in the *hare*, the relative size of it to that of the canals, is less than in the human subject.

‖ The *horse* and the *dog* have the *scala* of the *cochlea* which goes to the *tympanum*, somewhat larger than the other.

But in the *calf*, the *sheep*, the *goat*, the *hare*, and the *cat*, the *scala* that leads to the vestibulum is the larger ridge, proceeding from the frame of the *membrana tympani*, to which it is probably a sort of support. In addition to which, there is in the *cat kind*, an osseous process, that extends from the lower posterior edge of this frame to the promontory, and which, being prolonged in an oblique manner, divides the cavity of the *tympanum* into two unequal parts, which merely communicate with each other by a hole. The anterior of which cavities contains the bones of the ear and the *foramen ovale*; and the posterior, which is much larger, holds the *foramen rotundum*, and answers to the large cells in birds.

In the *hog*, and some others, the *tympanum* has osseous *septa*, which divide its cavity into cells, like those of ripe fruit.

to be flattish in the fore part; but the spherical form of the anterior portion of the eye varies in different animals*.

There are two eyelids in these animals, the under of which wants the cilia. The sebaceous follicles in them are very evident, and quite distinct†.

In regard to the coats which form the eye, there is in the *sclerotic* one the same sort of texture and proportional thickness in the different parts of it as in that of man. The *transparent cornea*, too, has a great similarity to that of the human eye. The change of this from that of the sclerotic is in some cases very evident, being simply an alternation of structure, the layers of these different coats being capable of separation without much difficulty‡. In the ox, the line of such separation is capable of being seen to be oblique, the cornea passing somewhat under the edge of the sclerotica.

The *tunica conjunctiva*, in these kinds of large animals, seems to be less adherent to the ball of the eye, than what is the case in man. This coat appears to be continued over the cornea from late inquiries. The choroid coat, as formed of its two layers, is likewise here very evidently to be noticed. The *pigment* on the inner surface of the internal layer, or the *membrana Ruyschiana*, on the back of the eye in these animals is green, being lost in a sort of azure blue; but it varies in different sorts of animals§. The form of the coloured part of the above coat is irregular, and seated principally on the temporal side of the entrance of the optic nerve. In all cases where this pigment exists in the eye, and lines the fore part of the choroides and the back of the iris, it is black in colour. But in some wholly white animals, as the *white rabbit*, there is not any paint upon the inner side of the eye; in which cases there is a high degree of redness, on account of the blood-vessels of the choroides shewing fully

* In the tabular statement below, the length of the axis of the eye is compared with the transverse diameter of it in man and a few animals.

	Axis.		*Transverse Diameter.*
In man, as .	1	to	1
or as .	137	—	136
In the ox . .	20	—	21
——— horse .	24	—	25
——— dog .	24	—	25

But the continued and changeable forms of the ball of the eye depend, of course, upon the external parts of it, which are the *tunica sclerotica* and *cornea*.

† In a great number of quadruped animals there is a third sort of eye-lid, which has been termed *membrana nictitans*, or *palpebra interna*. It is of the crescent form, and thick in substance, being placed at the inner corner of the eye: it is various in size, as may be suitable. In some cases it is only a partial covering; but in the *cat kind* it extends over the whole of the anterior part of the eye.

In the *hare*, its free edge is convex; but in many instances it contains a thin cartilage, which, in consequence of its imagined resemblance to a nail of the finger, is termed *unguis*. In the *hare* this cartilaginous plate is broad and triangular in the third lid of the eye. There is, for the most part, a row of pores upon this lid of the eye.

‡ In the *rabbit* and *hare*, the edge of the *sclerotica* is double, and embraces the *cornea* on both the sides of its margin

§ In the *sheep* it is a pale yellow green, or occasionally bluish.

In the *hog*, *rabbit* and *hare*, in which it is at the fore part, it is had of a brown cast; but in various other sorts, this *pigment*, at the back part of the eye, has light vivid colours, in which cases it is termed the *tapetum lucidum*. This *tapetum* is of a silvery blue, changing to violet in the *buffalo*, *horse*, *goat*, and *stag*. In the *dog*, it is a pure white, ending in blue, and in the *cat*, a pale golden yellow.

through the retina and the humours; but in case there be the least dark-coloured spot, this is not constantly to be noticed. The use of this coloured substance is probably that of its enabling the animals to see better and more perfectly in the dark.

The *processes* termed *ciliary* are apparently little different from those in the human subject, but more prominent and denticulated in the edge parts*.

The *iris*, in these animals, is commonly in colour more uniform than in the human subject, and of more thickness; but it varies in the former respect in different *domestic* animals†. In the iris of these beasts there is the appearance of a fibrous structure, which, if muscular, is thought may affect the pupil. The movements of this part are always involuntary.

The *uvea* is very evident in the eyes of these animals, and the striæ that are continued upon it from the ciliary processes are likewise very distinct. In the *pupil* of the eye the forms are various, but in these animals it is a sort of transverse slit, having the ends of it wider than the middle part‡.

The formation of the *retina* is in these animals quite similar to that in man. The optic nerve passes through the cribriform part, in the bottom of the eye, where it is expanded and formed; but it is differently arranged in some cases§. It has at its origin the appearance of the substance of it being collected into folds, or fibres that arise in a radiated manner.

In regard to the *aqueous humour* of the eye, it would seem to be in less proportion to that of the size of the eye, in these animals, than in the human body, but to vary little in other respects.

And the *crystalline*, on the other hand, takes up more space in these beasts, in relation to the other parts, than in man; while at the same time it is more spherical in its form. The scale, in respect to the form of *crystalline lens* in some *domestic* animals, is given as below‖.

There is proportionately a less abundance of the *vitreous humour* in these animals than in man, as while the vitreous humour is twenty times larger in the latter than the aqueous; in the former, it is only ten times as large, and in the *sheep* but nine times the quantity of that humour¶.

There is no difference in the *oblique muscles*

* In the *cat kind*, these processes are long and narrow.

† The colour of this part answers so much to that of the hair, that in such *dogs*, and some other animals that are *spotted*, the *iris* is not unfrequently of a mixed colour.

‡ In the *horse*, too, it is transverse, but has the superior edge projecting a little way.

In the *cat kind* it is a vertical slit, over which they have much command, being capable of sometimes contracting it to merely a simple line, and at others of dilating it to nearly a round form.

§ In some instances it so happens that the *optic nerve*, on entering the eye, immediately forms a slight projection without dividing, and forms a sort of oval *cupola*, which is a little concave in the middle; from the edges of which the *retina* arises; the fibres of the nerve being condensed on each side into two streaks, which are of a more dark white than the other parts of the *retina*.

‖ The axis of this part is to the diameter of it, generally,

In man,	as . . .	1 to	2
In the ox	— . . .	5 —	8
—— horse	— . . .	2 —	3
—— hare	— . . .	4 —	5
—— dog	— . . .	7 —	9

¶ The proportions of these three humours stand thus, in several different animals, as measured on the axis of the eye:

In man, as . . . 5, 4, 15. In

of this part in these animals from those in man; but the *straight* muscles of it are more in number, being four, without that of the *suspensorius*, which arises with them from the edge of the *foramen opticum*, and running between these and the ball, is fixed to the sclerotis a little behind the insertion of the straight muscles. It has somewhat the funnel form in these animals and the *horse;* and may assist the other muscles as the direction of its fibres may be.

There is a sort of *caruncula lacrymalis* in these animals, as well as a *lacrymal gland*, which last is divided into two or more lobular masses*. And for taking away the tears in these beasts, there is the *puncta lacrymalia* and the *nasal duct*†. There is besides these a gland termed *glandula harderi*, which is situated at the inner angle of the eye-lids, and discharges a whitish thick fluid through an opening under the third lid of the eye. It is formed of small lobes, and has much the resemblance of the true lacrymal gland in the nature of its structure. It is single, hard, and oblong, in its form and texture in these animals‡.

These are the chief circumstances and particulars in relation to the nature, form, and structure, of the organs and parts which are employed in vision, and upon which the perfection of sight in these animals depends.

ORGANS AND PARTS PRODUCTIVE OF VOICE.

In the organs and parts that form and produce the sound or voice in animals of this as well as other kinds, there are some particulars and peculiarities which are well deserving of attention. In them, two-thirds of the end of the glottis is made by a superior angle of the arytenoid cartilages, which bends backwards, and there is an inferior angle of the same cartilages which bends forwards and affords attachment to the *cordæ vocales*. The latter of these has the anterior portion rather free, sharp, and thin, but its posterior edge is blunt, and continued into the membrane that lines the rest of the glottis. The anterior ligaments are not met with, and the place of the ventricle is filled by the furrow arising from the projection of the *cordæ vocales*. The cunieform cartilages are wanting in beasts of this kind§.

In the ox — . . . 5, 14, 18.
——— horse — . . . 9, 16, 18.
——— dog — . . . 5, 8, 8.

* In the *hare* and *rabbit*, it is so large as to cover a great part of the eye, and even to pass out of the orbit on the side of the nose. The ducts of it are many, and capable, in large animals, of being seen passing through the upper lid of the eye.

† In the *hog*, this is likewise met with; but in the *hare* and *rabbit*, instead of the *puncta* there is a slit under the third lid of the eye, that opens into the lacrymal duct. The border of this slit is furnished with cartilages to keep it open, and there is a single lacrymal duct, and a small valve in its canal, to prevent the tears being returned upon the eye. In the *sheep*, the *puncta* are united into a long nasal duct, which terminates near the bottom of the nose.

‡ In the *hare* there would appear to be two glands of this kind, one of which is of a white colour, the other red, but both having apparently the same structure; and which are connected by cellular substance.

§ In the *pig*, the direction of the *cordæ vocales* is peculiar: they descend anteriorly; being long and sharp edged, and capable of being rendered extremely tense by the actions of *larynx*, which enable the animal to utter the *shrill cry* it is so remarkable for. The opening of the ventricle is posteriorly into an oblong *sinus*, that ascends between the internal membrane and the thyroid cartilage. The dimensions of this sinus have been thought large by some; but its real size is about that of being sufficient to admit the end of the little finger. It is this cavity that enables the animal to make the usual *grunting* noise, when at the same time the *cordæ vocales* are in the state of relaxation. In

These form the most material parts of the structure and connexion of the organs and several parts in these sorts of animals, on which the noises made by them have their dependance, power, and effect.

ORGANS AND PARTS OF DEFENCE AND ORNAMENT.

Most sorts of animals have some kind of means of defence afforded them, but in these they are chiefly their horns, and the hard matter by which their toes are covered and defended. The former are principally made use of in this intention, while at the same time they are in many instances greatly ornamental. They, however, commonly belong to these and other such animals as are of the gregarious kind, and which, unless much excited and irritated, or while under the parental or sexual impulses and instincts, are inoffensive and quiet. By means of their hoofs, too, they have a sort of defence given them for striking out with, and they constantly scrape and tear up the ground with them whenever much enraged and excited. In other kinds of animals, the teeth, too, often form the means of defence, which, in some cases, are formidable weapons for the purpose*.

In the *venison* or *fallow deer*, the thyroid cartilage swells out anteriorly, where the *chordæ vocales* are attached. In the *rein deer* there is a *membraneous sac* in the front of the thyroid cartilage. The opening into it is at the root of the *epiglottis*. This sac is very large, extending much under the neck.

In the *horse kind* the principal peculiarities consist in the sacs connected with the *larynx;* of which there are three: one is seated anteriorly, under the vault formed by the anterior boundary of the thyroid cartilage; the opening into which is under the root of the *epiglottis*. The other two are oblong sinuses contained between the lateral parietes of the *glottis* and the thyroid cartilage, and covered, in a great degree, by the *thyro arytenoidei* muscles, by which they are compressed. There is no anterior ligament of the *glottis*, nor properly any ventricle; but above the *chordæ vocales* on each side, there is a *foramen*, which leads into the lateral sac.

In this animal the apertures of the lateral sacs are long and wide, and have some resemblance to the customary ventricles of the *glottis*. The opening into the anterior cavity is very wide, being a shallow sort of depression. In the *ass*, on the contrary, the opening into each of the three sacs is a small and round hole, and the anterior sac is a real bag of much size.

In the *horse* and the *mule*, there is said to be, at the joining of the two *chordæ vocales*, a slight fold of the membrane, which is not visible in the *ass*.

The peculiar noise or sound termed *bray* is uttered by the *ass* in consequence of the extent of the laryngeal sacs, and their being so much separated from the cavity of the *larynx* by their having small apertures. It would appear that the *bray* is a compound discordant sound produced in consequence of the resonance of cavities differently sized.

In the *quagga*, the larynx has been found organized as in the *horse*, except in the circumstance that the membrane extending from one *chorda vocalis* to the other did not exist.

In the *dog kind*, the *chordæ vocales* are prominent, thin, and free; the ventricles are deep, and the membrane which lines them is wider than they are. The cuneiform cartilages have a sort of serpentine shape. The looseness of the *chordæ vocales* and the membrane of the ventricles, have, without doubt, a tendency to produce the *barking* noise of these animals.

In the *cat kind*, the anterior ligaments of the *glottis* are, as in the *dog*, contiguous to the parietes of the *epiglottis*, but are separated by a wide and deep groove on each side. The posterior ligaments, or *chordæ vocales*, are not loose or sharp. There are two small thin membranes near them, which, when they vibrate, produce the *purring* sound in the *cat's* voice. The anterior ligaments of the *epiglottis* are supposed to constitute the *chordæ vocales* in the *cat*, the ventricles being so very shallow.

* This is sometimes the case in the *horse*, and frequently in the *hog*, the *tusks* of which are capable of inflicting dreadful injuries when the animal is enraged and impelled to its defence.

Having now fully considered and explained the nature and various circumstances and particulars of the anatomy, and the situation of the internal parts, of the cow, the signs and different points in the process of bringing forth the young in different cases may be attended to and noticed.

SECTION VIII.—*Calving, in different situations and circumstances of the Cows.*

The cow goes about nine months with young, and but rarely produces more than one calf at a time. These beasts may be known to be near the time of calving by springing at the udder; by which term is meant, the distending collection of liquid in the bag, which, a few weeks before the time of gestation, or going with calf, is accomplished, as there seems, in some degree, the appearanceof milk, and which may be drawn from the teats. To spring at the bearing is, when this part is more than ordinarily large and distended. Young cows, in common, spring soonest at the latter, and the older kinds at the former of these parts.

If the weather be very cold, wet, and uncomfortable, the cows which are shortly expected to calve, ought to be lodged at night in a large convenient out-house, or some other such place, for a week or two previously to calving; as it may be the means of saving the life of the calf and also of its mother: for when the calf drops in the yard or field, under such circumstances, the hazard of its perishing through the inclemency of the weather is very great, and it may also considerably endanger the life of the dam. The approach of parturition, or calving, is discovered by the diminished size of the belly —by the tumid and enlarged state of the shape or parts behind—and, lastly, by the discharge from thence, which usually occurs several days previous to the event. The cow brings forth in a recumbent posture, and licks her young: some have caused the calf to be immediately rubbed all over with salt, for fear the cow should receive any ill effects from licking her offspring; but this is wholly unnecessary, as Nature generally directs the best. The cleaning, or after-burden, should immediately follow the calf, or at least in a short time; however, through the effects of weakness, accident, or a severe cold, it is sometimes retained, and comes away piecemeal, the cow being much disordered in the mean while; and it is not unfrequently kept so long, that it becomes putrid, and greatly injures, or wholly destroys, the animal. It has, therefore, been submitted to the consideration of those employed in such matters, whether, in certain cases, the extraction of the after-birth, vulgarly called the cleaning, in cows, by manual operation, would not be advisable, particularly with those which have required assistance, and have yet not cleaned; as numbers are yearly much injured, or ruined by the retention of it. If, from inattention or other causes, the animal should catch cold by calving abroad in sharp winter nights, which may be perceived by a refusal of her food, and by her trembling joints, she ought immediately to be driven into a warm shed, together with her calf, and fed with proper mashes, and with the best and sweetest hay. She should not be suffered to drink any water which is more cold than what she has been used to, and if the disorder continue, balls composed of aromatic cordial substances may be given in some suitable liquid, as cordial drenches.

It is too common a practice, immediately after calving, whether the cow drops her calf in the field or house, to remove it almost immediately, without permitting her to lick and clean it, by confining her and keeping her from

it. The practice of so instantly taking away the new-dropped calves from the cows is equally improper and inconsistent with nature, as the coating of slimy matter which covers them, as well as the after-birth itself, is usually impregnated with a sort of saline laxative material, which may be highly useful to the cows in such circumstances, by promoting the more free evacuation of the contents of the bowels, and preventing any inflammatory tendency in the more internal parts. It is, therefore, generally speaking, better to let such cows alone, in whatever situations the calvings may take place, and to supply them properly with much the same sort of food as that which they have before used, avoiding any thing that may cause relaxation in them. Cold mashes of the bran and reduced grain kinds may sometimes be found beneficial. The calves should almost always be allowed to suck the cows for a few days at first, especially if they be in the houses or yards, constantly taking away some of the milk before the calves are put to them.

It is, in most cases, best not to feed the cows too highly just before the time of calving, as many bad effects may thereby be prevented, and perhaps the future milking of the cows be much benefited by it, as the state of the udders and secretions may be rendered more favourable.

Such cows as are disposed to be in too much condition about the time of calving, will be much benefited, and made to calve well and safely, by having a more sparing allowance of food, and taking a dose or two of mild saline purgative solution, so as effectually to remove any tendency to constipation. Such cows, also, as are kept much shut up in the house about these times, may be greatly benefited by having more free and extensive exercise in the open air for some weeks before calving; as by such means they become more empty, lighter, and calve with greater facility.

Where the cows have much milk in their udders, just about the period of having their calves, it may sometimes be the means of predisposing them to that state which is known by the name of milk fever, as seen below, in which there appears much restriction of the several natural fluid matters, with a tendency to costiveness, which may be much relieved, and sometimes wholly prevented, by having the milk drawn from their udders, and a few doses of the above sort of solution given them before they are fed in the morning; keeping them out and in gentle motion. They should have plenty of water of the usual temperature of that to which they have been used, as where warm water is given, it is not so natural or proper, though much used. By these means they commonly soon become cool and free from complaint. After the business of calving has been wholly finished, it will generally be proper to let them have suitable supplies of water in the above state, the too common custom of giving warm water with oatmeal, or other such substances, being wholly unnecessary in most instances.

MANAGING OF THE COWS AND CALVES IMMEDIATELY AFTER CALVING.

Directly after calving, proper places should be provided for the cows to rest and lie quietly in, and as the first few days' milk is commonly of a purgative quality, some of it seems designed by nature as useful and proper for first evacuating and emptying the bowels of the new-dropped calves, as other mild purgative preparations, occasionally used, do not seem to answer so effectually. After the first day, it is best to confine the calves to some place near the cows; and if then the cows have more

milk than they want at each time of sucking, the superabundant quantity should each time be drawn away before they are admitted for that purpose, which is mostly twice in the day, but where the flow of milk is very considerable, three times may be more useful for a few days; after which, especially where there are any glandular indurations in the udders of the cows, they should be wholly removed; while in other cases they may be suffered to continue some days longer; as it must be evident that where the udders of the cows are in the former state, much injury may be done by the sudden pushes and jerks of the calves' heads against such parts of the cows, thereby causing much irritation and inflammation in such diseased glands, and consequently great injury to the cows.

The particular management of the cows, at such periods, is usually regulated by the nature and circumstances of the seasons in which they take place, as in the winter and early spring months, when the weather is very cold or wet, they should be housed instantly afterwards, and have mashes or lickings of the slightly warm bran, mill-dust, or coarsely ground grain kinds, given them two or three times in the day, with their usual supply of water. But in the more hot and burning season of summer they will often require or be benefited by suitable shade, protecting them from the power and over-action of the sun in the day-time, and from the cold and excessive dews of the night, being at the same time well provided with such mashes as the above, and good water as drink for a day or two. A slight shed in some cool place, when at a distance from the home yards, or other such buildings, may answer the latter purpose very well and cheaply in most cases.

SLINKING THE CALVES.

Cows of all sorts are sometimes known to cast, slink, or slip their calves in an early as well as more advanced period of gestation; and whenever this happens, care should be taken to keep the beasts apart from the rest of the herd for a night or two or longer, lest the other breeding cows should by a kind of involuntary impulse, unfortunately do the same. Cows sometimes slip their calves, in great numbers together, from no evident causes whatever. It may, however, arise from debility, or be occasioned by the joint great purgative and diuretic effects of fog, or autumnal grass and rich pastures, or from any cause of weakness. This accident will also arise from the sight, but more from the scent, of blood or carrion in the pasture, the animal in a pregnant state having a considerable share of nervous sympathy and irritability; hence, the necessity of keeping such matters or any offensive objects from the sight or scent of cows. Some cows are peculiarly liable to abortions, and consequently unlikely to yield any considerable emolument to their owners, and therefore should never be continued long in the herd. Pushing and riding on one another, too, may afford some cause of this in many cases.

In whatever way, or from whatever cause, the slipping of the calves in some cows may be caused, it would seem to depend much upon the particular state and habit of body; and therefore not easily prevented. Something may, however, be done by proper care in changing the places, and keeping the animals as quiet, and free from violent motion, as possible. All sorts of too stimulating and improper food, of which they are extremely fond, should be well guarded against, as by that means much benefit may be gained in prevent-

ing such accidents. Blood-letting in rather a small degree, with the use of rather strong astringent, strengthening infusions, of the vegetable, opiate, and aluminous kind, are found highly serviceable in such states of breeding cattle, as well as in those where they take the bull frequently, or do not hold after bulling.

Slinking cows do not give so large a quantity of milk the next season as those that go to the full time.

A cleansing drink, of the kind described below, has been found very effectual in removing the causes of obstruction, in throwing off the after-burdens and other matters in them, as well as in other cases.

Take of—Juniper berries, *in powder*, two ounces,
Bay berries, *in powder*,
Muriate of ammonia, or sal ammoniac, powdered, of each one ounce,
Nitrate of potash, nitre or salt-petre, two ounces,
Myrrh, *in powder*,
Supertartrate of potash, or cream of tartar, of each half an ounce, mixed.

The whole to be put in a quart of hot strong beer, and given while just warm for one dose, and repeated as necessary.

PRESENTATIONS IN CALVING.

When in calving a calf presents itself in a wrong position, the operator must exercise his judgment in effecting a safe delivery. The right position is, with its fore feet and head first, its back towards the cow's back, and the fore feet opposite to each other on the sides of the head; if it appear in any other manner, it may be considered as seated wrong in the uterus or calf bag or bed. When there is a necessity of turning a calf wholly in the uterus or bag, care must be taken that the beast be in a favourable situation or position, raising the hind parts a little, which will greatly relieve the animal. If the calf be dead, it may be removed, by being carefully cut in pieces with a knife; but much in such business depends upon the skill and experience of te operator.

In the right presentations there is seldom any thing to be done, as the whole takes place in a natural, easy, and safe manner.

But there are a great many wrong positions or presentations in calving, which require to be well considered, and the manner of regulating and putting them right for the operation, to be fixed upon before the business be undertaken. When this has been properly attended to, and the easiest and safest mode decided on, no time should be lost, as the cows are every moment becoming more weak and exhausted. In managing the business, the practitioner should always be particularly careful to direct the positions of the calves in such a way, as that, the least possible force may be required in bringing them away, since where great force is used, there will be far more danger and difficulty, as but a trifling force is necessary in common cases. Machinery of any kind should always be avoided, as the consequences are mostly fatal.

The unnatural positions of calves in calving are generally as described below: after the hand and arm of the person employed have been well prepared by softening and lubricating them with some proper greasy application; and after the waters have been discharged, the exact position is to be ascertained by the gentle introduction of the hand up the parts while the cow is without pains.

1st. Where the head and only one leg or foot presents, the head of the calf is to be laid hold of, when there are no pains present, pushed back in a gentle manner, and the other leg or foot brought forward right, when the calf may be drawn, or taken away with the most perfect ease and safety.

2d. When the head only presents, the two

feet remaining behind in the parts, the first is to be put gently back by the hand in the intervals of the pains, and the two feet carefully brought into such a direction that there may be no injury done by the calf coming away.

3d. When all the four feet have a position upwards, towards the back of the cow, it is wholly impossible to bring away the calf, until it be turned and put in a right direction in every respect; when by proper skill in the person employed, and giving the cow a suitable position, the calf may be brought away in a natural and easy manner in the time of the pains.

4th. Where both of the hind feet and legs present, (or if only one, the other is to be carefully brought forward,) and when they are both put into this direction, it is best to bring forth the calf in that way, as turning is difficult and dangerous, while this method is generally easy and safe.

5th. Where the head of the calf is enlarged by containing water, and the other parts shrunk, as may be known by the feel, if the calf cannot be brought away in the common manner, the business may be in general effected either by passing and tying a proper cord round each foot or the jaw parts, as most easy and convenient, and thereby assisting the calving when the pains take place. But when the calf is dead, the head may be opened, or the whole taken away carefully in a piece-meal manner.

6th. Where the shoulder or neighbouring parts present, there is commonly considerable difficulty experienced, as the hand is required to be introduced, in order to get at the fore legs, that they may be brought forward with the head into the right direction, and the calf be produced in that way; but in some cases it is better that the hinder leg should be brought forward, and the calf be taken away in that manner, as being more easily accomplished.

7th. Where the calf is dead, or much increased in size in the head or other parts, and the cow much reduced in strength, the use of an instrument becomes sometimes necessary, which is formed of a sufficiently long piece of very strong finely polished iron wire, with a small sort of hook or crook at one end of it, and a ring handle at the other; that while being passed, is so held in the hand as to be introduced without injuring the parts of the cow; and then fixed firmly in some proper hollow part of the head or other place of the calf which may be suitable in bringing it away. But when the calf is so enlarged, and the bed so contracted round it, as not to admit of its being taken away in this manner, it will be proper to have it cut and brought away in parts, which is to be cautiously done by a knife for the purpose, which, while being introduced, is to have the blade so disposed in the ball of the hand, and the point covered by the fore finger, as to guard the parts of the cow from the danger of being wounded in the operation.

These several positions are such as most frequently happen, and which may shew what is necessary to be done in any others that may chance to take place. In all such cases, the utmost care and patient attention will be necessary, and every thing should be done in the most cool and gentle method possible.

In all cases where the cows have been severely handled in the operation of bringing the calves away from them, as their internal parts may have been greatly hurt, it has been suggested that much benefit may arise to the cows from liquid substances of the camphorated, spirituous, oily, opiate kind being thrown up to them; but they can seldom be s ap-

plied in this way, as to be of any great use, nor do such internal parts in general stand much in need of them, in consequence of their being, in a great measure, excluded from the action of the external air. After all such severe trials, the cows should constantly be well attended to and fed with the best sort of food of the fodder kind, and suitable cool mashes of the most nourishing mealy sorts, and be kept in good airy cow-houses or sheds.

TYING THE NAVEL-STRING.

When the calf is dropped from the cow, and properly cleaned, either by the dam licking it, or by a clean linen cloth, take a thick waxed thread, and pass it when necessary several times round the navel-string, about two inches from the body; secure it fast, but take care in tying the thread, not to cut the navel-string, which might cause a fatal effusion of blood; then with a pair of scissors cut the navel-string a little below the tied part.

In case an accident from the thread cutting the navel-string should happen, so as to cause much discharge of blood, and in consequence to prove dangerous to the life of the young calf, no time is to be lost, but the bleeding orifice should have an application of the strong astringent or styptic kind directly applied closely to it, by means of a little lint, and kept tight by a bandage. The wound tincture, or any such powerful liquid application of the above sort will be found to succeed well in such cases. If the cut part should swell and take on inflammation, cooling discutient washes will be necessary, such as goulard water with a little camphorated spirit, first dressing the part as above, or with a mild digestive ointment on lint. If the calf should be much weakened by the too great loss of blood, nourishing cordials with good milk may be given by the horn with great benefit in some cases.

CLEANING AFTER CALVING.

In all natural cases of calving, this usually takes place of itself, almost immediately afterwards, without any difficulty or trouble; but where from particular circumstances it is too long delayed, it becomes necessary to take the cleaning away by the hand, when much attention is required not to use too great force in drawing by the cord that is attached to it, as it may be broken or the calf-bed disturbed. In such cases, there is rarely much difficulty or danger in taking it away where the cow is properly placed for the purpose, but otherwise it may be liable to be torn. In the execution of the business, the cow, as soon as may be after calving, is to be put into a well-littered standing, where the head and fore end of her is considerably higher than the hind parts, in order to give greater facility to the person employed. Some cows part with their cleanings more readily in a standing position, while in others, they come away with less difficulty in the recumbent situation. Whichever method is pursued, the person employed should take a cloth, or a little clean straw, and lay hold of the cord or cleaning to which it is fastened, drawing it forward in a gentle easy manner whenever the cow makes any effort to force it away; and though but little be gained at first, the whole will soon come away, much, however, depending upon properly assisting the animal in the time of the after-pains.

The hurtful effects of the cleanings remaining too long have already been noticed, and the propriety of their being taken away without much delay in all cases fully shewn.

The means of promoting the proper cleaning in common cases have also been noticed, and the

form of a suitable drink for the purpose given; but there are many things used with such intention which can have but little, if any, effect. If the cow be kept quiet, it will mostly take place naturally in a little time, without any thing of the forcing kind being given, which is most desirable in every respect, as being attended with the least danger and inconvenience.

CONTRACTION OR HORNING OF THE NECK OF THE LYE OR CALF-BED.

This is when the passage of the calf-bed is contracted into a very small circumference, insomuch that, at the full time of gestation, it will not admit even of a small hand, and grows so sinewy or horned as renders it utterly impossible for the cow to calve without assistance, and many have died under this dreadful inconvenience. When the cow is observed to be uneasy or sick for calving, and has reached the end of her time, and there be any apprehension of this affection of the calf-bed, there is no danger or impropriety in searching with the hand; but the inquiry must be made with judgment, and the hand, thus introduced, must be well greased, to prevent any irritation in the neck of the bed. If a horning of the lye be ascertained to be present, the parts must be dilated gently, by the hand, and by an experienced operator; every exertion must then be used, and no time be lost, to remove the occasion of obstruction, while the animal has strength to undergo the operation, and give aid to the attempt; for if too long delayed, the beast will be so exhausted, that all assistance will be fruitless.

When the business is accomplished, that part, or any other parts exposed to the air, bruised or over distended, must be well bathed, when necessary, with camphorated spirits, which may be conveyed up the neck of the bed by a syringe, and the beast should be kept in a moderately warm and comfortable situation, having at all times a plentiful supply of dry and sweet litter. As soon as the calf is extracted, and the hurt parts well bathed in the above manner, a drink, as below, may be given, when the cow is weak and much exhausted.

Take of, Aniseeds, in powder, one ounce and a half;
Juniper berries, powdered, two ounces;
Bay berries, in powder, one ounce;
Liquorice root, in powder, four ounces, mixed.

To be given in half a pound of molasses and three pints of good beer for one dose, being repeated as it may be wanted.

When the beast has had eight or ten hours' rest, a mash of malt or bran scalded may be given, and the cow be kept warm and dry. When she can rise to eat, she may have hay or grass as food.

RETROVERSION OR FALLING DOWN OF THE CALF-BED.

This accident generally succeeds a laborious birth or the extraction of the calf by manual exertion, in the older sort of cows. When it is the effect of natural weakness, owing to the constitution of the animals, and they are in the house, their stalls should be altered at or before the time of calving to be lower in the front part, and care be taken to prevent or mitigate that weight which so distresses them; as the improper form of cow-houses seems often to cause such accidents, as they seldom take place in calving in the field.

Such cases in many instances happen in consequence of the movements that attend the bringing away the calves, as well as from great relaxation in the ligaments of the parts, the peculiarity of the make of the cows, and other causes.

Where any thing of this nature is appre-

hended, the cows should be well looked to at the time of calving; in order that if it should take place, there may be in readiness a large clean linen cloth for putting round the calf-bed, as necessary, when down, in the case of the beast lying, and supporting it when standing, as well as to guard it from catching up filth, and against the effects of the external air.

The cleaning is then to be very gently removed, where not already come away, so as to avoid any injurious or fatal loss of blood; when this has been done, the whole of the parts that have protruded are to be well washed or bathed, some employing weak camphorated spirituous saturnine washes, a little warm, for the purpose, while others think equal quantities of cold spring water and vinegar answer better, taking care always to avoid any sort of oily or greasy application: but in cases where any thing of this kind is necessary, warm milk and water is probably the most proper liquid that can be used; as being the most mild and soothing. After this has been performed, the calf-bed is to be put up and replaced, which may commonly be accomplished without much difficulty and with perfect safety, after the hind parts of the cow have been properly raised, and the hand of the person engaged in the business well lubricated and prepared, by gently pushing and pressing up the whole from the middle part of it in a careful steady manner. And as it is liable to fall or be forced down again, much care is required to prevent that occurrence, which has been attempted by the use of small bent wires put through the hind parts of the cow, and other means; but with a view to prevent such accidents, and guarding against their taking place a second time, a leathern contrivance, of somewhat the nature of the cart-horse breeching, has been invented, and will be found to be much more convenient and effectual. It is fixed on the cow by means of a sort of surcingle, or girth, passed round her body, just before the udder, and from the upper part of which a tail-band proceeds so as to fasten on the tail; having a broad part of leather extending over the whole of the bearing, and closely fitting on it where the neck or other portion of the calf-bed may shew itself; which leather is so strapped as to pass between the cow's legs, and then divide and proceed on each side of the udder, being well secured in all directions to the girth. It is evident, that this contrivance may often be equally serviceable before calving as afterwards, where such cases are apprehended.

As soon as the whole of the business has been fully completed, the danger and effects of the after-pains of the cow are to be guarded against and prevented, by the use of such drinks as the following:

Take of, Strong decoction of oak bark, three pints,
Tincture of Cinchona or Peruvian bark, two ounces,
Tincture of opium, half an ounce,
Treacle, two ounces; mix them and make a drink, which may be given in warm beer, and be repeated as it may be found necessary.

Proper mashes, and water as drink, are always necessary, and should be carefully provided in such cases.

It is the common practice to give cordial drinks of the warm seed kinds to cows in this state, but except when they are weak and much exhausted, they are of little advantage. The following is much used:

Take of, Aniseed, in powder, three ounces,
Juniper berries, powdered, two ounces,
Coriander seeds, in powder, one ounce and a half,
Bay berries, powdered, one ounce,
Gentian root, in powder, six drachms; mix them together and give them in three pints of good beer with a little treacle, not quite cold.

INFLAMMATORY AFFECTION OF THE CALF-BED, OR DROPPING AFTER CALVING.

This is a disease which is not unfrequent, but which is mostly confined to such cows as are in full condition at the time of calving, whether in the young or more advanced state, and that occasionally arises in consequence of the severity which is necessary in bringing away the calf. It most usually and certainly happens in such cows as have large and distended udders for the milk just before they calve. And it would seem to be brought on by the particular state of the parts, and the too great action of cold in whatever way applied, or the effect of heat succeeding it. The cows are, for the most part, seized with it in two or three days, but sometimes almost immediately after calving. They in some cases fall down suddenly without having the power of getting up again for several days. It is sometimes termed the milk fever.

The appearances of it are a cold shivering, attended with a throbbing and great uneasiness about the stomach, with much loss of appetite; the pulse is quick, and the mouth dry; the milk disappears by degrees; there is much restlessness and depression in the appearance, with great and sudden loss of strength; the extremities are mostly cold, with the legs stretched out; and the usual natural discharge is either wholly or partially suppressed. As the disease proceeds, other appearances come on; the urine is either wholly restrained, or passes only in small proportion; the cow is much inclined to strain, and there is a rapid sinking of the whole animal powers.

The ease or difficulty in removing the disease, and the danger to be apprehended from it, may generally be known by the mildness or severity of its attack, as displayed in these appearances; but as when the affection is considerable, little or nothing is to be done, no time should be lost in attending to such cases.

In the onset of the complaint, the chief means of relief will depend on taking away suitable quantities of blood where necessary, and keeping the bowels well opened by proper purgatives, but in most cases the latter will be quite sufficient for the purpose, as there is generally a tendency to great weakness. The best method of opening the bowels, and keeping them in a proper state, is by the use of a strong solution of some of the purging salts, such as eight or ten ounces of those of either the sulphate of soda or magnesia in a suitable quantity of thin warm oatmeal gruel, and the throwing up occasionally afterwards warm oily weak broth clysters. But other mild laxatives often answer the purpose very well, particularly castor oil, in the quantity of a pint.

When the bowels have been thus emptied, advantage will be gained by such remedies as the following:—

Take of, Tartarized antimony, or emetic tartar, half a drachm;
Subcarbonate of potass, or salt of tartar, six drachms;
Columba root, in powder, two ounces; mix them into a powder; to be given in a hornful or two of warm thin gruel, and repeated as it may be wanted.

Where there is much restlessness with frequent straining, a ball of the following kind may also be given when the inflammatory state has been somewhat removed:—

Take of, Hard opium, two scruples;
Camphor, rubbed fine, two drachms and a half;
Castor, in powder, two drachms;
Treacle, as much as is necessary, to make them into a ball; to be given as above directed, and repeated as there may be occasion.

Dissolved or diffused opium, in the quantity of a drachm or a drachm and a half, in warm thin broth, may likewise often be thrown up into the bowels with great benefit.

When the disease begins to go off, as will be seen by the cows becoming less languid and depressed, eating their food more freely, and by the discharge being in nearly a regular state, the more strengthening remedies of the common bark and cordial stimulant seed kinds will become necessary; and should be given in full quantities, of four or five ounces of the former, and two or three of the latter, so as to completely restore the beasts.

Much attention will be requisite in most of these cases in order to keep the cows in a quiet state without being disturbed; care must be taken that they do not hurt themselves by struggling, and where they are incapable of taking the proper quantities of their usual food for their support, they should have it given them in the form of thick gruel, or in some other liquid state, by the horn, as may be necessary. It will be proper also to have their position standing, or lying much higher before than behind.

As, however, the prevention is much easier and better than the cure, it will be most prudent to attend in time to such cows as indicate a disposition to get into too much condition, or which have too great a secretion of milk, and their udders too much filled with it immediately before calving; as such cows are the most disposed to have this disease. The best means of prevention consist in putting these animals on bare and stinted pastures, or allowing them a less portion of their usual fodder for a certain time; and particularly by carefully drawing away the milk just before the period of calving.

Section IX.—*Suckling or fattening Calves as Veal.*

The practice of suckling or fattening calves for the butcher, in many situations and places, especially near large towns and in populous districts, where there is abundant and good convenient keep for the cows at all times, and where the demand for veal is constantly considerable, may be adopted as a profitable business by the cow-farmer; while under other circumstances it will be less deserving of his attention. With such views it may be materially beneficial for the suckling stock-master to raise his own cows instead of purchasing them gradually, as they are much better suited for the purpose, succeed more kindly, and, in many cases, are provided at much less expense.

It is of much consequence in this practice, and with such views, that the cows, of whatever sort they may be, should be regularly well, and fully fed, whether in the fields and pastures at grass, or when tied up in the stalls, and feeding on hay and such sort of fodder. In the former, they should be constantly changed, so as to have a plentiful bite of the more closely fed down sweet kinds of grassy herbage, so as to fill themselves well and readily; and in the latter, with the usual fodderings of the softer sorts of hay, be well and attentively supplied with juicy food of the brewer's grains, different rich forcing root and green vegetable kinds. Full supplies of good water two or three times in the day should likewise be carefully given. Suckle fattening will always prove a losing practice, unless the cows are fed in rather an abundant and perfectly correct manner; any sort of stinting never answers the suckling-farmer's purpose.

It is also very material, that there should be proper and suitable conveniences for conducting this sort of management in the most easy and profitable manner, such as proper bands and standings for keeping the cows quiet and tied up in, in one part of the building where this sort of business is carried on; while in

some other, at the least possible distance, there should be a number of suitable small-sized dark sheds or closets without raised floors, for the purpose of holding the suckling-calves. They should be of such sizes as just to allow the cows to turn into them, in order to suckle their calves with ease, and the floors of them should be so formed, as that they may be easily kept quite dry, sweet, and clean, for the calves. In some farms the calves are turned to the cows, and suckled by them in the cow-houses; but the former practice answers better where it can be adopted, though it requires somewhat larger cribs or closets. In this latter mode, the calves are secured by means of cords and pullies, the pullies fixed at the upper parts of such houses, and the cords passing over them so as to be regulated below; by which there is a saving of much labour and time, as well as the prevention of much disorder, a single individual being capable of conducting the business of a large suckling-house.

It has been stated by a late writer, that the most advantageous cow-stock for fattening calves, is that sort which gives the greatest quantity of milk, richness of quality being not so great an object, or so well adapted to the purpose. The Holderness or short-horned cows are to be preferred in this respect; not, however, to suckle calves of the same, but of a smaller, breed: perhaps Devonshire calves surpass all others as sucklers, whether for quickness of proof or beauty of the veal; but they are not to be procured, except in or near their own county districts and places. Many other sorts of cows are, however, employed, and those which unite the properties of great milking and fattening, are probably the best in such use.

The method most commonly employed in fattening calves is to allow them to suck the cow; as thereby the object is probably not only sooner, but more effectually, attained. The period necessary for fattening calves, must be different according to circumstances, but it is generally from seven to nine weeks; but in the dairy districts where milk is considered a valuable article, little more than half that time is allowed. Another method, but which is much inferior, is to give them the milk to drink, morning and evening warm from the cow, and the quantity increased according to their age and strength. In some districts, barley-meal, linseed boiled into a kind of jelly, and other articles of that kind are given to calves in the course of fattening. The latter of the above substances in the trials of Lord Egremont in Sussex, did not, however, by any means, seem to answer for this purpose; it was there boiled to the consistence of a jelly, mixed with skim-milk, in the proportion of a pint to a gallon. Some other matters are in use for the same purpose, as will be noticed hereafter. It is of the greatest importance in this business, whatever method is followed, to have good breeds of cows, to keep them constantly well fed, and to have the suckling-houses airy, moderately spacious, and perfectly clean and sweet. The calves should be kept in convenient pens or places, or close and well-littered houses.

It has been observed, that as it is necessary in this system that the calves should lie always quiet, in order that they may indulge in sleep, at those times when they are most employed in suckling, it seems proper, that the cow-houses should be situated in the most retired parts of the yards, and that the pens or confining places should be kept as dark as possible. The calves, however, should by no means be suffered to lie too hot in the summer-time, which would produce sickness among them. To admit, therefore, an occasional draught of fresh air, a window should be cut in each shed

or pen, with shutters, and these windows be opened whenever the closeness of the atmosphere indicates a necessity for it. In the summer season, they should rarely, if ever, be closely shut; and when it is required, the stream of air may be increased by opening the cow-house doors at the opposite sides or ends of the building. Each suckling calf should have a strap or collar round its neck, with a swivel fixed on it to prevent twisting, by which it may be guided, or, if necessary, tied up. Such pens or sheds should be kept constantly well littered with the cleanest and sweetest wheaten straw, some portion of which should be put fresh into them every day, and the dung, as well as all the straw litter removed, cleanliness and sweetness being essential points in the practice of fattening of all sorts of animals, but most particularly those of the calf kind, as their ordure is the most offensive of any other kind, quickly running into a state of complete putrid fermentation, and letting loose such a quantity of offensive gas. As the calves are dropped or otherwise provided, they should be put into these pens or confining places, and suckled each upon their own dams, as much as possible, which, in the outset, will mostly afford a much greater quantity of milk than the calves can take, so that in some cases another calf may be necessary for each cow: or the overplus milk may be taken from the cow and kept to be creamed for butter, or for any other use. As the calves increase in growth, they will, of course, stand in need of more and more milk, until the whole be in demand, and if that should not be sufficient, then another full-milked cow must be provided, as the calves must never be in any way stinted or limited for milk; but as one of the calves gets ready for the butcher and goes off, another suckler is to be regularly provided in its place in succession, so as to keep up the progression in the suckling-house during the whole season, in order that the whole of the milk may be consumed in suckling, which thus affords the best profit and most certain advantage.

The principal markets nearest to the suckling places are the most proper spots from which to procure sucklers, they being the best supplied with such calves by the milk-dealers and farmers, as are of the larger breeds, and therefore the most suitable and advantageous for the purpose, as reaching great sizes and weights; the greater quantity of milk required being thus compensated by the greater value. Besides, in this way, the exhaustion, accidents, and ill consequences from travelling a distance is avoided, or soon removed by the quietness of the sheds, pens, or other places, and the regularly increased supplies of milk, by which means it rarely happens that any loss is sustained by the calves being destroyed.

If young calves be suffered to suck as much as they will, they are not unfrequently affected with a sort of looseness of the scour kind, which may be prevented by limiting them during the first few weeks in the quantity of milk, and by attending to the time of sucking, proper care being taken that they are, on the other hand, by no means too much restricted, so as to occasion them to pine and have their growth and fattening impeded. After this early state or stage is past, they should, however, be permitted to suck until they are quite satisfied; and all such means as are any ways likely to excite and increase their appetites, promote digestion, and render them more craving and desirous of their food, should be had recourse to.

With this view, as well as to correct acidity, and give a greater degree of healthiness to the animals, chalk may be given, or placed by them

in the lump to lick with the tongue; the stomach is also much stimulated and excited, and the desire of food greatly increased, by the having common salt strewed in the troughs out of which they lick; the licking of rock-salt, too, has been suggested as useful in dissolving or breaking down the hairy balls often met with in the stomachs of suckling calves, and which are known to be present by the bad progress of the calves in fattening, and by their licking the lower parts of the cows, about the udders and hinder extremities. It is usual with some, likewise, to stuff their suckle-fattening calves with balls or pastes constituted of flour, finely powdered chalk, milk, and a small quantity of common gin. Others prefer gin-balls, simply formed and prepared by that liquor, in union with the finest and best wheaten flour; so as to constitute a soft mass, by moistening about a quarter of a pound of the latter with a large wine-glassful of the former liquid, and making two smallish-sized boluses to be swallowed by the calves. The use of common gin is, however, rather to be objected to, as by no means affording so proper or nourishing and fattening a stimulus to the stomachs of calves, as that of good rum, which is employed in such compositions by those who are better and more fully acquainted with the nature and effects of such compounds. Such balls or pastes being highly stimulating and nutritious to the stomachs and systems of young calves, supply, in some measure, the place of milk, while they operate in no small degree as narcotics, inducing a disposition to sleep, which tends greatly to promote and expedite the fattening process in them: however, where milk is to be had in sufficient abundance, they may in general be well fattened without these artificial aids, though not probably with so much expedition. These aids are yet of much utility and benefit, in cases where the demands of the calves are beyond the powers of the cows.

In order that the calves in the more summer season may be constantly provided with a sufficiently ample store of milk, it becomes necessary whenever the cows show any tendency to a deficiency, to change the pastures: while, in the winter season, such sorts of keep as are of a juicy, rich, forcing quality, such as brewers' grains, turnips, cabbages, parsnips, and others of the same kind, should always be in readiness as substitutes for the want of grassy herbage, which, with a due proportion of the more soft and sweet hay, may be sufficient for such milking purposes. After the calves get a few weeks old, they may have one or two of the balls given to them about the middle of the day, pushing them down their throats by the hand or horn with a little milk. These balls induce some degree of perspiration, often considerable, as they act pretty strongly in many cases; but this effect should never be permitted to be too much, but their degree of strength should always be regulated according to the ages and habits of body of the animals; as the younger ones, and those easily excited, of course, require balls of less strength than the others. Much benefit is gained by regularity in putting the cows to the calves, which is much better, where it can be done, than putting the calves to the cows. Where a little of the first milk can be spared to be taken away, it is also an advantage in the suckle-fattening process, as the last part, or strippings, as they are termed, are far more feeding to the calves than the first part.

In general, such calves as are suckled on their own mothers will fatten much better and faster than those which are bought in at an after period in succession to supply their places. The primary and natural causes of this difference are no doubt to be traced to

their never having been removed from the places where they were at first dropped, but having constantly continued to suck the milk of their parents; which must be more suitable and proper, as well as more nourishing and fattening, than that of any strange cow; in addition to which, cows fresh in milk, from having lately calved, afford milk which is more nutritious and fattening than that of more stale milked cows. It is common, also, to see cow-calves fatten better and more kindly than those of the bull kind; and the latter are generally more coarse in the grain of the meat, and the veal less tender and delicate, as well as inferior in its flavour. It is the practice in some districts of the county of Essex, to fatten the largest calves, and the farmers and breeders are deemed more expert and intelligent in the fattening of calves than those of any other situations, keeping them in general to a much greater age and size.

The time required for suckle-fattening calves must evidently differ, according to the nature of the breeds, their dispositions for the taking on of flesh and fat, and the circumstances of seasons and situations; but from six to eight, or ten weeks, are the most usual periods, as the calves may be small or large.

The writer of the different Rural Economies of the kingdom is clearly of opinion that to suckle, in general, after the calves are ten weeks old, is bad management, for his account in this respect is uniform—those of nine or ten having paid as much a week as those of twelve or thirteen; and although a calf of six weeks old may suck nearly as much milk as one of twelve weeks old, yet the first month or five weeks the quantity is considerably less, and this advantage of their infancy is doubly as valuable to nine as it is to twelve weeks.

The trouble and expense of buying in or providing sucklers differs as it respects the season and the kinds and qualities of the calves. In the hot months, when veal is the most reasonable, suckling calves are mostly the highest in price, as they are then scarce in the market and most difficult to be obtained. The price also varies much, as it relates to situations and other circumstances, from thirty to forty shillings or more. Calf suckling was formerly considered to pay well when each animal in the whole time of the process brought in a weekly profit of three or four shillings to the farmer; but under the present circumstances, a far larger weekly profit is necessary.

Neither the colour or flavour of veal is supposed so good in the younger calves, as in those which have been kept to a more advanced age, though some prefer it. Both these objects are obtained in the greatest perfection by keeping them to the age of about nine weeks in the manner already directed. They are mostly kept a shorter time in the summer season than in the winter, as the calves are then more rapid in their growth from the more favourable state of the weather, as well as from the then increased demand for small-sized veal.

In the course of the last three or four weeks' suckle-fattening of calves, blood should occasionally be drawn from them, as tending in some measure, it is supposed, to promote the fattening, as well as to render the texture and colour of the meat more fine, white, and delicate, which latter is of much importance, as being particularly required by the butcher, as where the contrary appearances are indicated by the eyes or otherwise, they are considered of far less value; though the veal be more juicy and far from indifferent in quality. The calves in such cases die *black*, as it is said, and the veal is not by any means so saleable as in those which die *fair*.

In the suckle-fattening of calves in the manner directed, where the sorts of them have been favourable for the purpose, they have, in some cases, risen to very great weights, such as fifty, sixty, and more pounds the quarter, meat or butchers' weight, at the above noticed ages of fattening; paying a large weekly profit to the suckling farmer, without any extraordinary keep for the cows at whatever season it might be.

In the suckling management, in Sussex, Mr. J. Ellam's cows are stated to pay on the average, 4*l.* each in meat, besides rearing many calves with the view of work, which are suckled about a quarter of a year. And a good cow will often suckle two calves for the butcher to a considerable profit, after her own has had her milk for nearly the above length of time. In other suckling districts, two cows fatten five calves in some cases without any extraordinary keep.

In several suckle-fed calves which were killed after the very careful experimental trials of the Earl of Egremont, in Sussex, the live and dead weights appear to have been these:

Calved 27th May, and killed 5th of August:—
Weight alive, 211 lbs.
——— dead, 133 lbs., which, if 140 lbs., would have been two-thirds.

Calved 28th May, and killed 8th of August: —
Weight alive, 209 lbs.
——— dead, 136 lbs., which, if 140 lbs., would have been two-thirds.

Calved 27th May, and killed 15th of August:—
Weight alive, 235 lbs.
——— dead, 154 lbs., which, if 156 lbs., would have been two-thirds, the live weight having been 234 lbs.

Calved 18th June, and killed 15th of September:—
Weight alive, 240 lbs.
——— dead, 160 lbs., which is two-thirds.

The most material improvements, besides those noticed above, in the suckle-fattening of calves, consist in letting them be fed or suckled more frequently than usual, such as three or four times in the day; in having lumps of chalk constantly before them to lick; the instantly checking and stopping any tendency to purging or scouring that may take place; and lastly, by having a small portion of bean or barley meal given them, with a little salt, so as to sharpen their appetites and increase the fattening process.

Section X.—*Weaning and Rearing Calves and Young Store Stock.*

These are practices in raising live neat cattle-stock, upon which much of its value and importance depends, and which are never to be lost sight of or neglected by the careful store-master or farmer, as good, useful, and profitable store-stock, can be produced only by such means. The female calves of such cow-stock as are the best for milk or other purposes, most hardy, sound, and perfectly suited to the nature, richness, circumstances, and situations of the land, should be selected and preferred, with the view of raising the most beneficial sort of neat cattle-stock. For this purpose, a suitable number of calves, taken from such cows, should every year, according to the circumstances of the farmers, be weaned and brought up, as being not only the most likely to turn out well, and afford the most profit, but as being capable of being raised at the smallest expense possible. In the practice of various parts of the country, there are several different methods pursued in effecting this sort of business, but the mode which nature points out is certainly in the first instance, that of sucking the mother for a time, which cannot however be long, in consequence of the great value of the milk for

other uses. The chief modes of the principal districts of the kingdom are as follow:

The best and most natural mode of rearing or bringing up young calves or neat stock, is, as just seen, that of allowing them to suck their dams, at least for some length of time after they are brought forth. In Yorkshire, however, the usual method is, that of giving them milk to drink, there being few instances where they are allowed to suck. For the first two or three weeks they mostly get milk warm from the cow: but for the next two or three weeks, half the new milk is withdrawn, and skimmed milk substituted in its stead; and at the end of that period the new milk is wholly withdrawn, and skimmed milk alone, or sometimes mixed with water, is given, till they are able to support themselves by eating grass or similar food.

In Cheshire, the practice is, to allow the calves to suck for the first three weeks. They are afterwards fed on warm green whey, or scalded whey, and butter-milk mixed: with the green whey, water is frequently mixed, and either oatmeal or wheat and bean flour added. A quart of meal or flour is thought sufficient to mix with forty or fifty quarts of liquid. Oatmeal gruel and butter-milk, with an addition of skimmed milk are also used for the same purpose. A meal of one of these kinds of food is given night and morning for a few weeks after the calves are weaned, but afterwards only once a day, till they are three months old.

In Leicestershire, the regulations attended to by the farmers in the raising of the best store-stock of this sort in that district, direct them to rear all the cow calves that are dropped in proper time, as well as so many male ones as are necessary for their own uses, and for any other purposes they may have in view: and by those who are in the dairy practice, to raise every year as many as are sufficient to keep up their milking stock and rather more, always taking the more early calved cow-calves. In some cases, the male calves are run and reared upon the cows, as well as the females; but a more economical and common method is to serve them with new milk for a week, ten days, or a fortnight, then with a sort of milky pottage, composed of water and very little milk, thickened in boiling by coarse oatmeal, barley meal, linseed meal, or oil-cake powder; sometimes also with whey, or whey pottage. They are fed in this manner, for six, eight, or ten weeks, or more; when they become able to support themselves on grass in paddocks or the pastures. In raising the cow-stock, the best bulls that can be had are made use of, as well as the best cows; and the most proper time for rearing such cow-calves, are, it is here supposed, some of the early spring months, so that they may be in a state to be early kept on the pastures, without taking from, and lessening the profit of, the dairy system, whatever it may be.

In Gloucestershire, the calves are not allowed to suck above two or three days: they are then weaned and fed on skimmed milk, which is previously heated over the fire. When able to eat a little, they are allowed split beans or oats and cut hay, water being mixed with the milk.

But in Devonshire, about the Barnstable, or more northern, district, the regulations pursued by the breeders and raisers of calf store-stock, are somewhat different from those of other places. Many there give a decided preference for rearing to those calves which are dropped in the more early part of autumn of the preceding year, to such as are calved towards the latter end of the second month in the new year, notwithstanding the care and expense in attending and nursing them during the winter, is much greater, as they generally make much

better stock. By far, the greater number of calves, however, are dropped between the latter period and the month of May, or later in many cases; yet, among the best breeders and rearers, such late calves are not by any means approved of. In the raising of them, the usual mode there is, to let the calf suck as much as it will three times in the day for the first week; then to bring it to the finger, and have it served with warm new milk in the same manner, for three weeks longer; which is the usual mode of managing the business for the first month; after which, the calf is fed for two months longer, twice a day, with as much scalded warm skimmed milk as it will drink; when, by gradually diminishing its morning and evening meals of this sort, at the end of four months it is completely weaned from all kinds of milky liquid feeds, and left to itself for support. Small portions of the fine powder of linseed cake are, however, recommended to be used with the skimmed milk.

In other parts of the North Devon district, there is a little variety in the manner of conducting this business; the March calves being there preferred, as attended with the least expense in rearing. The cows in these parts are suffered to be the nurses for a fortnight or three weeks; after which, the calves are served twice a day by the finger, with food composed of two quarts of new milk, and one quart of scalded skimmed milk, mixed with a quart of gruel, prepared by boiling bruised flax-seed, with as much water as is equal to six times the measure of it, for four hours; and then adding to it the other ingredients, which are thus warmed and made fit for giving to the calves. This method is pursued for about three weeks after the calves have been taken from the cows, when the new milk is left off, and they are then fed twice a day with two quarts of scalded warm skimmed milk, mixed with an equal quantity of flax-seed gruel, continuing the same until about the middle of summer; by which time, the calves so dropped, will be in a state to go on well with the pasture grass and a few oats daily, to the eating of which last, they should have been accustomed while in the pens.

In Sussex, the method of rearing calves is very different from any of the before-mentioned ones. It is common there to allow them either to suck for ten or twelve weeks, or to wean them at the end of three or four, and to give them a liberal allowance of skimmed milk for six or eight weeks longer.

The breeding and rearing practices of this district are deserving of much attention, being the most profitable, perhaps, of any in this branch of farm management. The cows kept are in proportion to the extent of the farmer's occupation, and all the calves, or nearly all of them, are reared, being kept much in succession for work. In some cases, the calves reared, are equal to the number of cows: the females are sufficient to keep up the stock of cows; and if other females should remain, they are frequently exchanged with neighbours for males. Others, however, spay the females and work them as oxen; of course, the variations in practice depend on circumstances. In case the cows continue good to an advanced age, fewer female calves are weaned to supply their places. In regard to the best time for calves to be dropped for rearing, there is a difference of opinion among the breeders; some preferring such early ones as come in the first month of the new year; whilst others, think those falling in the two first months of the spring to be the best. But whatever the time may be, it is the custom universally for the calves to suck the cows from ten to thirteen

weeks; the males, as well as females, are cut at seven weeks old, and are weaned by being shut up; and having a portion of grass given to them until they have forgotten their mothers, when they are turned out into the pastures. The first winter they are well fed with the best hay; but afterwards with straw, except while working in the beginning of the year, when they have hay; though straw is their food until they begin to work. In this practice there are variations met with, but of no material consequence: there are many who do not let the calves remain at night with the cows, until they are from five to eight weeks old, according to the quantity of milk which the cow gives. In some instances, one cow will suckle two calves. The cow-calves which are reared, bring each a calf at two years old, which runs with the mother all the summer, during many months, and is termed a *hurter* in this district.

In the system of neat cattle rearing for work, as practised by the Earl of Egremont, in the above district, the calves which are dropped from the last month of the old year, to the end of the second month in the new one, are weaned immediately, never letting them suck at all, but giving them the milk for three days as it comes from the cows. For weaning on skimmed milk, they should, however, be dropped in the last month of the year, or the one before or after it, when they should be kept properly free from too severe cold by housing; by which means they will be equally forward with the calves dropped late in the spring, which run with the cows. Together with the skimmed milk, a little oatmeal is given, but not until the calves are two months old, and then only because the number of them is too great for the quantity of milk, which on that account is mixed with water and oatmeal. As heifers with their first calves do not become good milkers, unless their calves suck for the whole season, they are exceptions; but with their second calves they are treated in the same manner as the others. In May, they are turned to grass in the first winter; from November, they feed upon rouen or aftermath, as it is sometimes termed; the following summer, from May, they are at grass; the second winter on straw, of which, however, they consume very little, as they run out on short rough grass. They are said to have been tried on hay alone, but straw and grass are better. *See working Oxen.*

The benefits to be derived from these practices of breeding and rearing, have been found to be very considerable by those graziers and dealers in neat cattle-stock, who have been most in the habit of experiencing the disadvantages and inconveniences of other modes. *See Grazing.*

The custom of the farmers in Suffolk is, to let the calves suck from five to seven weeks, then giving them a mixture of coarse bran, and rough ground oats with skimmed milk and water, letting them be always provided with some sweet green hay until they are turned out into the pastures. The expense of the oats in these cases might be much lessened by the use of the root of the carrot, which would also be beneficial to the calves.

In the adjoining county, the calves are admitted to suck twice a day for the first fortnight; then to have the pail for an equal length of time; after which, reducing it to once a day for five or six weeks more, at the same time having sweet cut hay, turnips, and other such matters placed in their feeding troughs. These sorts of food, when combined, are excellent for rearing calves, as they thrive well on them. and stand in need of little water.

There are two methods pursued by the far-

mers in Scotland, which seem well adapted to the purpose. The first, which is certainly the most agreeable to nature, and therefore preferable to any other, is to allow the calves to suck their dams; and the second is, by giving them a pailful, containing about a gallon of milk, warm from the teat of the cow, morning and evening, for eight or ten weeks.

When skim milk is used it should be boiled, and suffered to stand until it cool, to the temperature of that first given by the cow, or a trifling degree more warm, and in that state be given to the calves. Milk is frequently given to the calves scarcely warm, but it is much better when boiled. If the milk be given too cold, it will cause the calf to skit or purge. One gallon of milk in the day will keep a calf well till it be thirteen weeks old. A calf may then be supported without milk, by giving it hay and a little wheat-bran once a day, with about a pint of oats. The oats will be found of great service as soon as the calf is capable of eating them. The bran and oats should be given about mid-day: the milk in portions at eight o'clock in the morning, and four in the afternoon: but whatever hours are fixed upon for feeding the calf, those particular times should be regularly adhered to. If the calf is kept but an hour or two beyond the usual time of feeding, it will become uneasy and pine for food; therefore, regularity in this respect, is of great consequence. Calves reared in this manner are to be enticed to eat hay as early as possible, and the best method is to give them sweet hay and little at a time. Turnips or potatoes are very good food as soon as they can eat them; and they should be cut small and mixed with the hay, oats, bran, and such sort of food.

It is not absolutely necessary to give milk to calves after they are one month old. In order to wean them by degrees, two quarts of milk, with the addition of linseed, boiled in water to make a gruel, should be given together; and, by diminishing the milk gradually, the calf will soon do entirely without it. Hay-tea will answer the purpose with the same addition of two quarts of milk; but it is not so nutritious as linseed. The best method of making this tea is, to put such proportion of hay, as will be necessary, into a tub; and then pour on a sufficient quantity of boiling water, covering up the vessel, and letting the water remain long enough to extract the virtues of the hay. When bacon or pork is boiled in sufficient quantity, it is a useful practice to preserve the broth, and mix it with the milk for the calves: indeed bacon-broth is absolutely necessary when the calf is costive.

Sometimes, in summer, calves may be reared on whey only; but when reared in winter, they must be fed with hay, and clover-hay is esteemed the best for the purpose. Calves may also be reared with porridge of different kinds, without any mixture of milk.

It has been suggested as a good and convenient plan to bring up a calf under another mother: an old cow, with a tolerable stock of milk, will suckle two calves or more, either turned off with her or at home, keeping them in good condition until they are old enough to shift for themselves. They ought to suck the first of their mother's milk, for two or three days, although many are weaned without ever being suffered to suck at all. Calves, whether rearing or fattening, should also always suck before milking, as the first and thinnest of the milk is sufficiently rich for the calf. Old milk will, perhaps, scour a very young calf; but the effect will mostly go off without any ill consequences.

Another method has been proposed for the

early periods of weaning, which is, to take a gallon of skimmed milk, and to about a pint of it, add half an ounce of common treacle, stirring it until it be well mixed; then to take one ounce of linseed oil cake finely pulverized, and with the hand let it fall in very small quantities into the milk, stirring it in the mean time with a spoon or ladle until it be thoroughly incorporated; then let the mixture be put into the other part of the milk, and the whole made nearly as warm as new milk when taken from the cow. The quantity of oil cake powder may be occasionally increased, as well as the treacle.

It has been the practice with some to wean calves with success, without any milk at all, by means of linseed jelly, made by boiling a pint of the seed in three quarts of water for about ten minutes, and then mixing it with good hay tea in a suitable proportion.

Potatoe meal, too, is also an excellent substance for this purpose, when used in the same way, as being highly nutritive, and uniting well with milk, weak broth, or the tea infusion. In this way, much expense may be saved by the neat stock farmer in raising his calves.

The proper degree of warmth for the skimmed milk, on which calves are reared, is best indicated by the feel; but when they begin picking about, the feed may be given warm or cold, as it may happen.

It has been practically observed, that calves, when dropt during the grass season, should be put into some small home-close of sweet rich pasture after they are eight or ten days old, not only for the sake of exercise, but also that they may the sooner take to eating grass. When they happen to be dropt during winter, or before the return of the grass season, a little short soft hay or straw, or sliced turnips, should be laid in the trough or stall before them.

The most proper period of the year for weaning calves is in the early part of the spring; which is accomplished by letting them at first be suckled in the usual manner, for a limited time; when, instead of turning them to the cows any longer, they should have their intended liquid food given to them, by having their mouths gently forced into the surface of the liquid material for their support, contained in the pails or tubs, and the fingers of the person employed in the business must supply the place of the teats of the cows. There may at first be a little disinclination to suck the fingers, but the calves soon get the better of it, and the habit becomes quite easy and familiar to them; and they are then fed without the least trouble or difficulty. After a little time a lock of sweet hay may be substituted for the fingers; and as the calves increase in age and size, they will suck and take the milk or other fluid food out of the vessels without any assistance whatever. The food suitable for rearing calves is at first pure milk, but which is soon either wholly changed, or combined with some other sort. After a month or six weeks, it is beneficial to mix a little milk pottage, or pot-liquor pottage, with each serving of the calves; which method may be continued until the calves become ten, twelve, or fourteen weeks old, only gradually lessening the quantity, or lowering the quality, of the pottage, until, at length, it may become almost simple water. If the season be suitable, when the calves are weaned, they should always be turned, in the day-time, into some good grassed paddock or close near the yards or buildings where they are lodged in the night, in order that they may early learn to feed on grass, and become indulged in their usual playfulness of disposition, which tends much to promote their health and growth. Such grass calf-closes should, how-

ever, be constantly at some distance from the places where the mothers are kept, in order that no disturbance may be produced; and they should be quite free from ponds, ditches, breaks, and every sort of annoyance or obstacle that may endanger the existence of such frisky, youthful, incautious animals. And that they may be the better satisfied and accustomed to such sorts of grass pastures, the pottage should be taken, in its pure state, to them regularly at each of their feeding times. For the first six, eight, or ten weeks, as the circumstances may be, the young calves should be regularly brought up every night out of the pastures, and safely lodged in the pens, cribs, or other places, in order that they may be well protected from injuries of every kind; but, in most cases, after such ages, the calves may be safely left in such pastures in the night-time, as well as during the day, taking their proper feeds when necessary, as above directed. During the whole of the summer season, much attention is, however, to be paid, that they be properly changed in the pastures, so as to have constantly a good bite, and be well kept up in growth and flesh. Towards the approach of the autumn, they should be taken up into the yards; and if they can have the convenience of a small grass-pasture field, near at hand, wholly to themselves, it will be so much the better. While in such yards, they should have the best and sweetest soft hay given them, being turned out on the dry pastures in fine open days, but well sheltered at nights; as warmth and good keep is very material in the rearing young neat cattle-stock, the effects of which will be seen at every period afterwards. There is no sort of live-stock, perhaps, that pays better for good early keep, than that of the cow kind; but when stinted at that early period, they will never rise to their proper size, and, consequently, the farmer sustains much loss. As soon as the calves have attained their first year's growth, they have the title of *buds*, or *yearlings*; and though then capable of mixing with the herd, it is better, where it can be conveniently done, to keep them in pastures by themselves. Otherwise they should be turned out with the dry-store stock, and by no means with the cows, as they might thereby be induced to take the bull, which would entirely ruin them at so early an age: and if in the following winter they were kept and managed as before, their growth afterwards would be found to be more perfect, and they would fully pay for the keep then afforded them; but as they are much more strong and hardy, a less valuable sort of keep may be sufficient, good pea or other straw supplying the places of hay and other expensive food. The calves likewise do well, at this age, in low rough pastures, especially while the season is mild, open, and not too wet. At the after periods they may be kept and managed as the rest of the herd.

It has been asserted, that some farmers in Norfolk bring up all the year round, rearing every calf that is dropt. That others rear in winter only, fattening their summer calves for the markets. That the farmers there, in general, begin early in winter to rear their calves. That no distinction is made as to sex; males and females are equally objects of rearing, and are both occasionally subject to castration, it being a prevailing custom, to spay all the heifers intended to be fattened at three years' old; but such as are intended to be finished at two years' old, are generally left open, as are, of course, such as are intended for the dairy. The reasons for this practice are, that they are prevented from taking the bull too early, and thereby frustrated in the main intention, and by this precaution they lie more quietly, and

are kept from roving at the time of fothering. The method of treatment depends, in some measure, on the time of rearing, but the management of no two farmers is exactly the same. The chief peculiarity of the method of rearing calves, which is there practised, may be said to be with milk and turnips.

Upon the whole, it may be safely concluded that the best method of weaning and rearing calves is with milk, either sucked from the cow, or served by the finger for a short time, then by the use of the pot liquor, or good hay tea, mixed with some of the less heating meals; after which, by linseed jelly, mixed with such liquor or vegetable infusions; and lastly, by the usual quantity of milk and hay of the clover or some other of the artificial grass kinds, which the calves are soon induced to take by having a small portion tied up and suspended just within their reach in the places where they are kept. Or the calves may be turned into the yards where these sorts of hay have been closely put up for the purpose, as the waste under such management would not be material, as has been ascertained by the same practice with sheep in snowy stormy seasons by several storemasters. In such cases, the calves would feed in the open air, and at the same time have the shelter of the yards. If the hay be well trodden down in the putting up, there will be little loss in the practice, as some nice managers might otherwise suppose to be the case. Such calves as are intended for bulls may be weaned and reared as well by the tub or pail as by sucking the cows at so very great an expense, and will become equally good or better stock, being finer in the head parts, and having less loose hanging skinny material about the fore parts of the breasts, which arises, in a great measure, from the difference of habit in their feeding. In the business of weaning and rearing calves in these, or any other modes that have been noticed, it is a circumstance of great importance to keep the bowels in as regular a state as possible, by the liquid materials that are employed in feeding them. In this view, where milk is used with vegetable teas of the hay or other kinds, some mild laxative substance, of the herb, plant, tree, bark, or other sort, should be employed in their preparation, in such due proportions as may be necessary to suit the different cases, as young rearing calves are much disposed to constipation and the injuries which arise from it. Infusions of this nature should always be prepared from such well got good green hay, whether of the natural or artificial grass kind, as has suffered neither too much nor too little fermentation or sweating in the stack or mow, and which is the most abundant in nourishing properties. The infusions, in the more advanced spring and summer seasons, should only be made a few hours before they are given to the calves, but in the winter months a day or more before they are used. They should be mixed with the milk after being boiled so as to be given just warm to the calves. The best way of making the infusions is by cutting the hay and other substances rather short, and putting them into a proper tub or vessel and pouring boiling water immediately upon them, covering the whole up quite close by means of a thick woollen cloth. The hay may be used in about the proportion of half a pound to a quart or three pints of water, according to the goodness of it. The pot-liquor of the house, especially where of the more oily or greasy kind, formed from fatty substances, is highly proper and useful for preserving the bowels of the calves in the necessary regular open state without any trouble, and at the same time affording great nourishment for the support of the calves.

The less heating sorts of meals and brans may likewise be most beneficially made use of in combination with some sorts of the rather laxative, but more nutrient, kinds of roots or plants, such as cut turnips, boiled or steamed potatoes, rasped or grated carrots, sliced cabbages or cauliflowers, and others of similar kinds and qualities, being mixed, at the time of giving them, with a suitable quantity of cut clover, hay, or other chaff. The heating meals, as those of beans and peas, are for the most part improper in this sort of practice. The quantities of the flours, meals, or unground oats and brans, that are usually employed in this manner, are from about half a pound of the two former sorts, to a pound or a quartern of the two latter, in the day; which, with the other food, support them well.

In using milk, two gallons, or rather less, in the day, will be sufficient for supporting a calf for the first quarter, when hay and pure water will supply their place in the winter months, and in the summer, good pasture grass; but, in order to lessen the quantity of milk, after one month of age, they may be weaned in a gradual manner, by giving only two quarts of milk daily, mixed with a sufficient proportion of either linseed jelly or hay infusion. When calves are reared at the pail, they should always be induced to feed on hay as soon as possible, in order to be the sooner weaned.

In the tub method of rearing calves, they are sometimes apt to get the habit of sucking one another's ears or other projecting parts, which does them much injury in many ways, and prevents their proper thriving; therefore, in order to guard against this habit, they should be so tied up in the pens, cribs, or other places, as to be prevented from getting at one another, without, however, being too closely confined.

In the rearing of young calves, care also should be taken that they lie clean, dry, and free from any disturbance, in order that they may have the advantage of reposing quietly. They should be well and frequently littered down with wheat straw, as the other sorts are very liable to infest them with vermin. They should have sufficient room, and the places in which they are kept should be capable of being well and readily aired, and they should constantly be supplied with plenty of pure water to drink. In serving them with their daily food, it is likewise very material that as much regularity as possible be observed respecting the hours fixed upon at the different seasons; six or seven in the mornings and evenings in the summer months are probably the best, and eight or nine in the mornings and four or five in the evenings during winter.

The principal object to be kept in view, in the weaning and early rearing of calves, is to save the consumption of milk, in sucking or other ways, by the proper combination and use of such nutrient substances and matters as have been mentioned, or others that may be found more cheap, beneficial, and convenient for the purpose.

The raising and providing of store live neat cattle-stock may be made a profitable branch of farming, in most situations where the pasture land is suitable, and of sufficient extent; but, of course, will prove most profitable and advantageous, where, in connexion with theusual requisites, there is, at the same time, the capability of producing full supplies of green vegetable crops for the winter support of such stock; as the cattle can be, in that case, brought forward in the best manner, and with the greatest economy to the farmer and breeder. But in other cases, where there is but small extent of land, it will seldom be attended with success, as the produce may mostly be converted to greater

advantage in other ways. In whatever situation or circumstances, however, the raising this sort of stock be actually undertaken, it will always be found necessary to have the young of such stock fed and kept in the best possible manner, as it is of the utmost importance in the raising of good neat cattle-stock; for where the contrary practice prevails, and the young cattle are either stinted for food in their early growth, or supplied with such as is not sufficiently good in quality, they can never thrive well afterwards, or make profitable stock. This is a principle which holds good equally in respect to all sorts of live-stock; nor should it be forgotten, that besides good feed, attention is also requisite, in a considerable degree, to keeping the animals in a clean comfortable state, in order to raise them to the most advantage. It has been well observed, that yearling neat cattle-stock should be well foddered with good hay and proper root crops in the winter; and with such thorough good keep, be preserved perfectly clean by the use of litter; as the contrary practice would inevitably stop their growth, and prevent its being recovered by the best summer food. Where hay is not to be had, the best straw must be used in its stead. and, at the same time, the roots, such as turnips, carrots, potatoes, or others of a similar kind, should be given with greater attention, and in a more plentiful manner. The most proper sort of food, for steers and two-year old heifers, is hay, when reasonable, or good straw with fodderings of turnips, cabbages, and other vegetable substances. Some persons consider that the advantage of such roots or green winter food for this sort of live stock is so considerable, that they cannot be made use of with more benefit in any other way. The young cattle should have a daily allowance of them for the first two or three winters. Whenever straw is made use of as fodder for such young stock, without these sorts of food, where it is not of a good quality, or partly blended with some sort of grassy matter, a small portion of good hay should constantly be mixed with it, to preserve it in a proper state for the purpose; the cattle being served with such fodder in regular small proportions, for when too large quantities are given at once, they do not thrive so well.

In the winter supporting of young store neat cattle-stock, it is also of much consequence, that they be kept considerably warmer and more sheltered from cold rains and wet than is commonly the case; as by such care and attention they are found to have a more full and quick growth, with a far less consumption of food, than under the contrary circumstances of too much exposure. These objects may be readily accomplished, by either tying them up in stalls in the places where they are kept, at such times, or by letting them have the range and cover of the sheds in the yards which are well enclosed and kept. It is always useful, that they be indulged with fresh free air as much as possible daily. In both the winter and summer keeping of young neat cattle-stock, there are many causes and circumstances which render it necessary to keep different sorts and ages of this kind of live stock distinct and separate from each other; such as those of their feeding in a less interrupted and inconvenienced manner in respect to one another; and the young stock of different early ages, mostly requiring that such as are but just beginning their growth, should be better fed, or have more full keep than such as are older or more advanced; and their being much less subject to accidents in many ways.

The point of practice in winter keeping and raising neat cattle-stock, as to whether tying

up or leaving them loose in the yards, is the best and most proper, the former now gains preference, though there may be many cases where the latter may be best. It was, indeed, long since found, in a northern county, that such young cattle as were kept tied up and regularly supplied, even with straw, in a moderate quantity, did far better than those left loose, in the more southern parts of the country, when in the midst of plenty; but how far this might not depend on the breed of the cattle, the greater warmth, the resting more perfectly, or the feeding more regularly, and eating more with an appetite, is not decided. The trials of others lead to the same conclusion; and show that tying up is the only method that can be properly made use of in many cases. In either of these modes of management, the latter of which has unquestionably the advantage, with a view to raising manure, much attention is necessary with respect to keeping the stock always supplied in as even proportions as possible, as by such exactness much benefit will arise in the saving of food, as well as in the improvement of the condition of the cattle. In some cases, where all the sorts of neat cattle-stock are constantly kept tied up for most part of the year, the advantages of it, on long careful trial, have been found to be such, that one third of the food is saved; besides which, the cattle made use of for labour are on the spot ready for work, the cows are milked with a fourth part of the trouble generally attendant on other modes, a great deal more real dung is made from the whole cattle-stock, and there is no poaching or treading the ground in any injurious way. It has, however, lately been contended, that neither store nor fattening neat cattle-stock, either eat their food, or go on so well in this manner, as those which are kept lose and take their keep in the open air. If it be so, the stimulus of fresh air and exercise may be the principal cause of it, by exciting a greater secretion of gastric juice in the stomachs of the beasts, and thereby occasioning more food to be taken in, digested, and formed into chyle and blood for their support, growth, and increase in fattening.

On the authority of practical experience, it has been stated, that the practice of feeding and keeping cattle loose in proper sheds and yards fitted up for the purpose, instead of the method usually employed of tying them up, is not only better for the cattle, by giving them fuller exercise in the open air, and consequently rendering them less liable to be injured by exposure when put early to grass; but also by preventing them from being cramped and hurt in the feet and other parts. Therefore there may probably be utility in both cases, under different circumstances and conditions of the cattle.

Section XI.—*Pens for young Calves, in Rearing and other Purposes.*

It is customary in most places, to have the pens or places where calves are kept for the purpose of being fattened, annexed to the cow-houses; but this last object is often better and more readily and effectually accomplished in closer and more dark and confined sheds or other such places. It has been suggested, that for rearing calves, the only reason that can possibly be assigned why these pens should be within the cow-houses or buildings, is that it saves some little trouble to the persons who serve the calves in carrying the milk to them. It is not, however, in common, a method to be advised, as it cannot but be known to every one conversant with the nature of cows, how fondly and strongly such as have newly calved cling to, and fret after, their calves, using

their every endeavour to guard and protect them; in return for which, the young calves are not less attached to their mothers; therefore, to be taken away and put near to, and often even within the hearing of, the cows, is highly improper, as their pains and frettings are thereby increased and continued, and they become more than usually uneasy. Under which circumstances, it is impossible to suppose that the cows can either feed properly, or yield milk of that quantity and goodness which they otherwise would. If there should be a number of cows in the same place, several of which have lately calved, one calf may keep the whole in a restless and disturbed state: to prevent which, the best method is to have the calves so remote, or the partitions between them and the cows so constructed, that their cries cannot be heard. In which cases, the cows soon forget their calves, and consequently eat their food, and yield their milk much better; at the same time the calves should not be at such an inconvenient distance as to cause too much loss of time and labour in attending them.

In the rearing or raising of calf-stock, it is of the utmost importance, as has been already stated, that the calves lie warm, sweet, and dry. Some think it useful, too, to have the calves tied by means of halters, from the very period of calving; while others are of opinion, that they should be kept constantly loose in the pens or other places, and be suffered to be at full liberty. Which of these modes is the best, has not been decided; it is not, however, improbable, but that each of them may be found beneficial under different circumstances. The main point to be considered in the forming of pens for the calves, in the practice of rearing them, is the constructing and laying of the floors, which should always be formed of laths or spars, about two inches in breadth, laid at the distance of an inch or so apart, upon firm joists placed across for the purpose, so as to cause the floor to rise about a foot and an half from the ground. By this means, they may always be kept quite dry, by permitting the whole of the moisture to pass away readily, and also have the benefit of fresh air constantly admitted underneath the littery material, by which the whole place is preserved in a perfectly sweet state. Under other circumstances, the pens would be very foul and unwholesome in the smell, so as to be greatly injurious; all the urine or wetness should therefore pass away by paved drains, the whole of the hollow under parts should be well cleared out when foul and dirty, the same as the upper floor. The litter, in such places, should never be suffered to accumulate in any large quantity, as the moisture produced by the calves will not so easily pass through it, but the whole will be kept wet. The too common practice of putting the litter on floors without being raised in this manner, one layer over another until the calves be finally taken away, is highly objectionable; being very unhealthy to such young stock. As suitable divisions are seldom found in such rearing or other pens, it would undoubtedly be proper and useful to keep the young calves separate and distinct from each other, as they would thus, not only be fed in a more easy and ready manner, but be less exposed to injuries and accidents. If divisions or partitions of this sort were made of thin deal slips nailed on small framed posts, they might be so contrived as to be easily moveable at pleasure, so that the stalls or pens might be increased or diminished, according to the ages and sizes of the calves. The other advantages of such pens are, that little room is required for many calves, and that their food is capable of being more equally and easily distributed to them.

In case of a great many calves being brought up and fed together, to the amount of twenty or more, there might be a contrivance in such pens, by means of which, by pipes and troughs or tubs, the whole number of them might be supplied with their milk or other liquid food at the very same moment of time by a single person; and that any determined quantity might pass into each of such vessels and no more; but as such means would seldom be required, as so many calves are but rarely raised and fed together at the same time, it is not necessary to enter into any description of such a ready manner of feeding so many young animals.

All such pens for the rearing calves, as well as the places for the suckling ones, should always have the floors so contrived, prepared, and paved, that they carry off all moisture readily, and may be kept perfectly sweet, clean, and in order.

In the rural economy of the county of Gloucester, it is stated, that the pens of this sort are there of an admirable form and construction, being extremely simple, yet particularly well suited to the intention for which they are designed. All young calves, but especially fattening ones, require to be kept narrowly confined; quietness being, in some measure, essentially necessary to the thriving in both kinds. The pen being loose, or a great length of halter, are circumstances which give a freedom to their natural fears, as well as a loose to their natural playfulness. The following description of a pen, capable of containing seven or eight calves, shews the manner of construction which is suitable: the building or inner place, where it is formed, has the dimensions of twelve feet by eight; four of which, in its width, are taken up by the stage, and one by a trough put in the front of it; leaving three feet as a sort of gangway for supplying every thing necessary to the calves, and into the middle of which, the door opens. In constructing the floor of the stage, laths of about two inches in the square are made use of, being laid lengthways of the stage, and one inch apart. The front division fence is formed of staves, about an inch and an half in diameter, and nine inches from middle to middle, being three feet in height: entered into the front bearer of the floor at the bottom, from which cross joists, or pieces of timber, pass into the back walls, and the whole is rendered steady at the top by a rail; which, as well as the bottom piece, is entered at the different ends into the end walls. The holes in the upper rail are of sufficient width to allow of the staves being lifted up and taken out, in order to give admission to the calves; one of which is fastened to every other or third stave, by means of two small strong rings of iron joined by a swivel; one of which playing upon the stave, and the other receiving a broad stout leathern collar-strap, which is to be buckled about the necks of the calves, to keep them in their proper places. The troughs are for holding barley meal, chalk, and other such substances, as well as for resting the pails or tubs upon in serving them. Two calves take their food out of one of such vessels, putting forward their heads between the staves. The distance or height of the floors of the stages from those of the rooms of the houses or buildings in which they are formed, is about one foot, as it is thought to be improper to place or hang them higher, lest the wind, by drawing too much underneath them, should produce such a great degree of cold in severe seasons, as to hurt the calves in their growth. This inconvenience might be readily prevented by stuffing the sides closely up with dry litter, or littery long dung; but it soon gets wet and hurtful by the large discharge from the calves, and of course, re-

quires to be frequently removed and replaced by new; it would, therefore, be better and more safe to have such stage-floors only a very little raised in pens of this sort. It is almost unnecessary to state, that such stage-floors are proper and suitable only for calves having their principal food from the pail or tub, and not for those which are in the practice of sucking the cows. Places of this nature, whether for rearing or suckling calves, should neither be too nearly or too remotely situated with respect to the cow-houses, as each case has many inconveniences and disadvantages attached to it, as already seen.

In some districts, pens of this kind are called stages, probably from the floor being somewhat raised above the common floor.

SECTION XII.—*Proper Yards, Buildings, and other Conveniencies, for store neat Cattle Stock.*

Something of the rounded or octagonal plan or form is the best and most suitable for the buildings and standings of such cattle, as affording the greatest facility and convenience in different respects in their erection and use, and at the same time giving the fullest and readiest opportunities of seeing what is going on in them at all times. The eastern or north-eastern sides of the yards should be occupied with rather high shed buildings of such kinds, having good-sized gangways and rooms for storing their food in, whether of the root, plant, or other kinds, and for foddering them conveniently and readily. They may be so contrived as to have doors opening to the inside, as well as the outside, of the circle, which may occasionally have advantages. But the nature of the situations and other circumstances must, however, direct these matters. In general, single sheds, open behind, may answer best for the young store stock, but for cows those of a double kind may sometimes be more proper, though much more expensive.

The stalls for the cows may be about six feet in width, and twelve in length, which will hold two beasts perfectly well; but for younger animals less size may be sufficient, as about five feet, where the practice of tying-up such sorts of stock is in use, but they are often not tied up at all. Each standing should have stakes of wood or rods of strong iron, with large rings of iron for running up and down, fixed about half a yard from the head of each side partition, to fasten the cows to by the necks, with bands of wood or chains of iron made and fixed to them for that purpose; there being at the head a low sunk sort of rack or box for holding the fodder, so that it may not be wasted. In some cases there are a sort of moveable frames which hold the heads of the cows fast while they are milked, as may be seen in the plate of the short-horned or milking breed of cows, placed in the front divisions of the racks. They should be of proper lengths, so that the cows may stand or lie with perfect convenience, their heads extending over the low racks or boxes before, while their hind parts just reach the grips or channels behind them. Their floors should be paved or laid with strong boards, in such a manner as to be a little higher behind than before; as when the contrary is the case, the cows are liable to be injured by too much forcing at the barings, and by the too great pressure of the calves backwards on the udders, thereby bruising and inflaming their glandular parts so as to cause swellings. The dung and urine are by these means discharged into the hind grips or channels so as to be readily drained and swept away. Such grips should have the width of about two feet, with the depth of twelve or fifteen inches, being made

a little sloping to each side, and regularly declining in an easy manner from one end or side to the other, so as readily to carry away the liquid matters they may have continually falling into them. Rearing calves of some age and store stock often do well in such yards without binding up at all in the sheds, having them to run under when necessary. Such stalls answer well too in the practice of soiling, as will be afterwards seen.

In yards of these kinds, which should be level throughout, with the exception of very slight gradual gentle declinations to some one or two particular convenient parts, where there should be other receptacles besides these below properly formed for taking in, and containing the whole of the surface variously impregnated moisture and wetness falling on them, with the several other liquid matters that may be upon them, the bottom of which yards being laid with some sort of impervious materials, so that the fluids may drain and slide readily down into them, the water from the roofs of the buildings being carried off by means of proper spouts. In this way a vast accumulation of valuable and useful materials will be made in no great length of time, and much convenience and economy promoted. It would be greatly useful, too, in addition, if the sheds for the rearing and store animals were made capable of being divided from the rest of the yards, in a moveable manner, with sufficient space of smaller yards, as by such means they would feed and go on better, be less liable to accidents, and less apt to be disturbed.

URINE AND DUNG.

In preserving these, where it is possible to provide proper and convenient places for securing them in at no great distance from such yards and stalls, it will always be the best and most convenient method, as saving much expense in time and labour, preventing litter, and promoting cleanliness in the most effectual manner, a circumstance which is of the first consequence to the health of the cows under whatever sort of management they may be. Thus, by having proper under-ground covered drains proceeding from such sheds and stalls, leading to and connected with suitable prepared reservoirs for containing and holding the urine and other matters, so as to be often thrown over rich earthy or mouldy and other substances in properly formed and covered places adjoining; not only much excellent manure will be formed and produced, but the neat cattle in such stalls and sheds be the most readily and easily kept sweet and clean. Besides, in this way such liquid matters are used to the greatest extent and advantage; as the urine neither of beasts nor mankind can ever be safely employed in its simple concentrated unmixed state, showered over crops either of the grain or grass kind; as if done in hot seasons they are destroyed by the too powerful action of their saline materials; and if in wet seasons, their salts are dissolved, washed away, and in a great measure lost, though this last is by much the better and more safe and successful practice; and has long been had recourse to in both the northern and southern parts of the kingdom with benefit on such crops where cautiously used, but with far less advantage than when in the combined earthy state. The urine of animals, though very beneficial in some cases, is far inferior to that of the human kind, which is much stronger and richer in saline matters.

The nature of feeding and fattening stalls and buildings will be considered when we come to speak of the practice of stall-feeding animals.

Section XIII.—*Practices in Cow-keeping for Milk*

Much nice and correct attention is required in the business of keeping animals with this intention. The cows most necessary and useful in this sort of management are those which afford a large quantity of milk; fineness of form being never so much attended to, and such cows as do not yield a sufficiently ample supply of this fluid should commonly be immediately disposed of as improper and disadvantageous.

It is now fully proved, that for this practice of the London cow-keeper, the Yorkshire or short-horned sort is the most proper, if not the only breed of cows yielding the largest quantities of milk, and at the same time standing the high forcing keep and the heat of the houses, which are necessary in such management, much better than any other kind; since from repeated trials that have been made with other sorts, not any one has been found so fully capable of withstanding the effects of such keep. It must, therefore, be greatly beneficial to have this kind of cows in all such cases, as affording so much larger a quantity of milk than most other sorts, while fewer in number are found sufficient for the purpose, which lessens the expense of their keep and that of providing them and keeping up the stock; in addition to which, they mostly preserve themselves in better condition for being fed out, and ultimately afford a much greater quantity of meat. This quality of thriving and standing better under such management than other sorts is supposed chiefly to arise from their having shorter hair and thinner hides.

But though this kind of cows are constantly found to answer most perfectly in the town practice of cow-keeping, and though few other kinds are ever met with in it; yet other sorts are often useful and highly proper in country situations, where, with suitable feeding and management, they answer very well.

Although cows may commonly be continued for a considerable length of time, yet in the practice of cow-keeping, from the high manner in which the animals are obliged to be fed and kept, it is necessary to change them frequently. Some may be continued as milkers with advantage from two to four years, according to the constitution of the animal; but they should not in any case be kept too long, as the vigour of the milk secretion is much less in old than young animals; and the old become liable to swellings and indurations in the udders, as well as other complaints of that kind. The cow-keepers feed their cattle in this high manner in order that they may produce as great a quantity of milk as possible. It is customary in the neighbourhood of the metropolis, and some other large towns, in two, three, or four days, according to circumstances, after the cows have calved, to send the new-dropped calves to be sold in the markets. The cows are thus left in full milk from within a few days of the time of their calving. This, however, in other situations, cannot always be the case, as the demand for suckling calves is less; of course, they must be often suckled by the cow-keepers themselves.

The practice of the milk-dealer is only capable of being carried on with adequate profit and advantage in cases where abundance of all sorts of food, both for the summer and winter support of the animals, can be readily provided, and in situations where the population is such as to afford a ready and certain demand for the produce at all seasons.

It has been stated that though the large breeds of cows may at first, while the supply of food is of the green succulent kind, and in

large proportion, afford a greater abundance of milk, yet that the smaller sorts often continue to yield a more regular supply for a much greater length of time, which more than compensates for the difference in the quantities on the commencement of the milking in the former sort. The large sort is, however, mostly to be preferred for this use.

Such cows should constantly be selected for this purpose as are wide in the horn when of those breeds which are horned; thin in the head and neck, having the dewlap not too pendulous or hanging down too much; the carcase rather flattish, with much depth; the hips wide and somewhat pointed, having the buttocks round and fleshy; thin in the legs, but with short joints; the udder capacious without being fleshy, and stretching well but not too much backwards, with the milk veins large and strikingly apparent; the teats large and of a good length, having the surface skin fine and even. It is greatly useful, and almost absolutely necessary, that the cows should be of a tame and gentle disposition. The cows proper for this and other dairy uses of course differ very materially from those of the ready-feeding kind. They have never the fine full fleshy appearance of them, their food being chiefly converted to the purpose of milk instead of flesh and fat. The large provision of milk in most cases necessarily keeps such cows in a lean state, while those which are disposed to quick feeding, though they may afford a pretty full quantity of milk for a short time at first, soon decline or quite fall off after the periods of dropping their calves.

In keeping cows for milk, where the practice is not to bind or tie them up in proper houses, particularly in the winter season, it will always be necessary to have warm well-sheltered yards, with proper open sheds, and suitable cribs, boxes, or other contrivances for holding the fodder and other matters in, that they may be well protected and prevented from being too much exposed to sharp and severe weather; and consequently be enabled to afford larger supplies of milk than in cases where they are suffered to continue in a state of open exposure to rain and cold in naked dirty damp places, as is much too common a custom in this sort of business. The bottoms of such yards and places should constantly be well laid with proper hard materials so as to have the liquid matters well drawn off into properly formed reservoirs, and the dung and dirt be frequently well scraped off in order to preserve them perfectly clean and dry by proper means, good water being at hand as drink. By such means, and the tying up the cows in the sheds, the most profit and benefit may be derived in this practice.

In this management, it is always the most beneficial to keep the cows constantly well up or in good condition, as when they are suffered to get quite lean or too thin, especially if it be in the winter season, it is found almost impossible to bring them to afford any full supply of milk, by any state of improvement they may obtain in the summer months; as when they get too greatly reduced at the periods of calving, nothing that can be done in managing them afterwards will ever bring them, for that season, to afford nearly the same quantity of milk which they would have given, if they had been kept in good proper order throughout such winter periods. Plenty of good juicy nourishing food should, of course, be then given in regular suitable proportions, with full supplies of water; and when the state of the season is very cold and inclement, the cows be kept warm and sheltered. If in this practice, too, the cows were kept constantly well cleaned by

currying and rubbing or any other such means, it would tend to make them give more milk, and be also useful in rendering them more healthy.

It has been stated, that the cows kept for the purpose of supplying the metropolis with milk, are mostly of the large size, and from the most perfect milking breeds of the above sort of stock in Yorkshire and the neighbouring counties. The dealers in these cattle buy them of the breeders when they are from two to three, or four years' old, and in calf; when they expose them to sale at the convenient fairs and markets, near the above place, in continued weekly supplies, by means of which the London cow-keepers are chiefly enabled to keep up their several stocks. That breed or sort which is supposed to give the largest quantity of milk, is always preferred, as quantity, and not quality, is, in these cases, the primary consideration.

We are also informed, that the cow-keepers breed very few cattle, and those only from favourite cows, becoming so merely from their giving much milk, and with very little attention to the choice of their bulls.

In summer, even, and when the grass is in the greatest plenty, the cows in this practice are regularly fed with grains; which, though the quantity of milk is thereby increased, by no means adds to its quality. The general allowance has been forty-five quarters of grains in the week to every twenty-five cows. They are given twice a day, and they have besides two meals of turnips and hay.

Some cow-keepers have tried salt mixed with the grains, more with a view to preserve the grains longer in a sound state, than from any consideration as to the health of their stock, or the improvement of the quality of the milk. It is acknowledged, that the cows eat the grains so mixed with greater avidity; but the proprietors not getting an adequate return for their trouble and expense, it is not at present so much practised as formerly. It may be useful, however, in making the cows take in more water, as well as in the other ways. It has been observed, that in this sort of business the cow-keepers find great profit and advantage, in keeping the animals constantly well fed with different kinds of rich succulent food, such as brewers' grains in a fresh unfermented state, turnips, cabbages, green tares, fresh-cut grass, and soft green rouen, or hay that has undergone little or no fermentation in the stack: as by this means much juicy matter is thrown into the system, and a continually varied stimulus kept up, by which a large increase of milk is produced. And as the different articles thus employed must have less effect in exciting the secretory organs of the animals, in proportion to the frequency of their use, the utility of varying their food as much as possible is rendered sufficiently obvious. On the same principle, too, there are various other substances, as well as these, that may be made use of with great benefit, as the experiments which have now been made with them, with this view, lead to many useful conclusions. There is another circumstance that deserves the attention of the milk-farmer in the feeding of his cattle, which is, that of the dry food being properly proportioned to that of the green or rich succulent kind; as, where this is not well attended to, the cows, by being kept in too lax a state of their bowels, from the great tendency which such materials have to run off in that way, may afford a much less quantity of milk than would otherwise be the case. We know, from repeated experiment, that considerable loss sometimes takes place in this manner. In the foddering of the cows, regard should also be had to supplying them with the food in such a way as to

excite the secretions in as regular a manner as possible. With this view, too much food should never be given at one time, but supplied more frequently, as three or four times, or oftener, in the course of the day. This practice will likewise have an advantageous effect, in having the fodder more cleanly eaten up.

METHODS OF PRACTICE IN FEEDING AND FODDERING THE COWS.

It may be noticed, that the cows are thus fed in the practice of the cow-keepers in and about the metropolis, and some other large towns, where they are confined in the stalls of the houses or sheds of the yards in the night time: about three o'clock in the morning they have each a half-bushel basket full of grains; when the business of milking is finished, a bushel basket-full of turnips each; and very soon afterwards an allowance of hay of the best green, soft, grassy, or other good kind, is given them in the proportion of about one truss to ten cows. These different feedings are mostly made before eight o'clock in the morning, at which time the cows are turned into the cow-yards. About the middle of the day, they are again confined to their stalls, and served with the same quantity of grains as in the morning: after the afternoon milking, which continues till near three o'clock, is finished, they have again the same quantity of turnips served to them; and in about an hour afterwards, the same distribution of hay as before. This manner of feeding is, in general, continued through the whole of the turnip season, which is from the beginning of the autumn to the beginning of the spring. Through the other months of the year they are fed with brewers' grains, cabbages, tares, and rouen, or after-grass, or other good hay, in the same proportion, and continue to be regularly fed with the same food, exactly in the same manner, until they are turned out to grass, when they mostly continue in the fields or pastures all night; but even during this season they are not unfrequently fed with the above sort of grains, kept and preserved as below for the purpose.

In this practice, in and near the metropolis, and other large towns, where they have much occasion for grains and other sorts of juicy food, as they become scarce or are procured with difficulty, a mode of keeping the former has been contrived by securing them in sunk tubs or pits made for the purpose; which, after being filled with them, tightly trodden down, are covered over in a very close manner, so as to prevent the action of the air upon the grains, by which means they are preserved and kept quite pure and fresh from the beginning of spring until summer; when the business of brewing declines, or is wholly discontinued, at which period they are dug out, the surface part of the grains and the external earthy covering being taken off and removed, both of which may have contracted a mouldiness. Grains so preserved usually come out perfectly sweet, fresh and good, and are, of course, greatly convenient and beneficial in the feeding of the cows. They are, likewise, capable of being kept somewhat in the same manner, though not so well, being more exposed to the action of the air and heat, in large tubs or casks placed on large sleepers, rising from six to eight inches, or more, above the ground, which casks have holes bored in or about the bottoms to let off the moisture, and by being closely pressed or trodden down in such tubs, the liquid matter that is contained in the grains is forced through the small openings in and about the bottoms, and by this means fermentation and its destructive effects are prevented. In this manner this sort of food may occasionally be preserved for some

time in a state proper for the use of the cows, without losing their sweetness or acquiring any disgusting taste. In the practice of cow-keeping in the country, such modes of preserving this sort of food will seldom be found necessary, as they there only want them in the winter as food for their cows; as in the summer season there will be plenty of the natural grass, which is the best and most proper sort of food for the production of milk, and with which the country cow-keeper is mostly well supplied at such times; but which the cow-keepers in and near the metropolis cannot by any means obtain in a sufficient or proportionate degree. Consequently, the deficiency must be made up by such preserved aud other food as can be provided in the easiest and most reasonable manner, which should always be done at the most leisure periods of the cow-farmer's business.

It is stated, that near Leeds, in Yorkshire, the milk-dealers, in some instances, feed their cows with cut grass, in the summer season, and with brewers' grains and oat straw in the winter. And that in the vicinity of Sheffield, the most experienced cow-keepers give five hundred weight of linseed dust, mixed with three hundred weight of bran, in the week, to six cows; others give a quarter of a peck of beans with a peck of grains, for one feed, for one cow, three times a day. These methods are probably too expensive to be generally adopted; but as they are found to answer well, they may be employed with advantage in particular situations and circumstances.

In other places, as Manchester, Liverpool, and some other large towns in different parts of the country, somewhat similar modes of feeding, and sorts of food, are had recourse to; but in the practice of some milk dairy-men, grass, hay, and grains, are the articles chiefly employed at all seasons of the year, which are considered to be the most productive of milk, and consequently the most profitable.

DIFFERENT NEW MODES OF KEEPING COWS.

Cow-keepers and milk dairy-men, however, in different situations and places, have of late endeavoured to discover a less expensive and more ready and convenient sort of food and keep for cows that are under the milking system, than those of grains and hay.

SUBSTANCES OF THE LINSEED KIND.

These are of many different sorts, such as the dust, bruised parts, and even the oil, of linseed, in mixture with the bran of wheat, but which last, on full trial, have not been found by any means to answer the purpose intended; a circumstance which is not at all to be wondered at, since such expressed oil, when used simply in combination with such a husky material, must be not only far too heating, drying, and stimulating, but must want the necessary distending as well as juicy qualities, in order to the production of much milk. Therefore some sort of the more distending nutricious kinds of artificial grassy fodder, should constantly be given in a due proportion, at the same time, with the view of the secretion of that fluid being increased by the stimulating quality of the oil.

The refuse part of such seed, containing a large portion of mucilaginous matter, is far more nourishing, and possesses more forcing and fattening properties, as is daily found in giving it in the state of dust, bruised powder, cake, or in the thick jelly-like form when diffused in water, than the simple oil, however combined with bran or other such matters. However, in these latter forms, some distending material is equally necessary to be thrown into

the stomach at the same time, in order to produce the best and fullest effect, such as cut chaff, coarse bran, and many other such matters.

Trials have also been made, by giving oil-cake diffused in water, and then mixed up, thickened, and well blended with the bran of wheat, the cut chaff of straw of the oat kind, and those prepared in the same way from clover and meadow hay, the latter being found the best. On these sorts of food the cows are found to milk as well as fatten well, but the expense is too great to repay the cow-keeper.

Linseed-cake, wheat-bran, bean-meal, hay cut as chaff, and in the uncut state, have likewise also been given as the keep of milking cows, with success in the production of milk, but it is a dear sort of keep, and is but little profitable to the milk-dairy man.

Linseed-cake, too, in its simple and uncombined state, has been tried, when sufficiently low in price, and the cows have been found to milk well, and some of them even get fat on it, though the major part not always sufficiently so for the butcher; but those which have been deficient, have commonly been discovered to be greatly injured in their habits of body and constitutional powers, so that such forcing sort of food is not to be generally approved of or employed in the practice of cow-keeping.

MEALS OF SEVERAL SORTS.

Rich forcing meals have also been occasionally made use of in the keeping of cows for milking, such as barley-meal, and others of a similar kind, with the usual sorts of fodder; but they have proved ill-calculated for the purpose, from their tendency to render the cows dry in a very short time by the effects of their stimulant mode of action on the systems of the animals.

TURNIPS.

Turnips are employed by some in this sort of management, but though they are found to keep the cows well up to the quantity of milk they usually give, they will not produce much increase of it. They are, consequently, given more by way of preserving the animals against the effects of their high keep, as they promote their health, and keep them from being so quickly destroyed by the excess of stimulus produced by the rich food they daily consume, than as producing any great increase of milk. Many are in the habit of using them in large quantities, but they are too expensive in the providing to be profitable, as they very rarely pay the charge in the milk. They are bought in from great distances, as fifteen or twenty miles, in many situations, and always at great expense in the combined charges of price, labour, and carriage.

POTATOES.

When cheap, potatoes have also been largely used in the practice of cow-keeping, but they are not found to answer well as a food, when given alone, in any large quantity, not tending to preserve or promote the health of the cows, or render their milk of so good quality as that which is produced by many other sorts of food; on the contrary, when used in large proportions, for any length of time, they are apt to prove hurtful to the cows. Some think them bad food, as being liable to produce diseased states of the lungs, but which is probably not the case, as they have no property or tendency of that nature. The cows are found to milk tolerably well on them; but there is often afterwards much loss sustained in the injury which they thereby receive, as well as from their being a very expensive sort of food. They

are probably best given in mixture with turnips, in nearly equal proportions, as in that way no very material injury is done to the animals, while the condition of the cows is kept up, and some of them made ready for the butcher, which would not have become so on other sorts of food or keep. They are often used in the raw state, but they have a far better effect on the animals when prepared either by boiling, steaming, or baking, but are thereby rendered somewhat more expensive.

GRAINS.

Different sorts of grains, as those of the brewers and distillers in large towns and places, are very commonly made use of, the advantages of them being very great. Those of the distiller are probably the best for the purpose, especially when given in mixture with the cut-chaff of some one or more of the different sorts of hay, such as that of clover, meadow, or rouen. The last of these is found to be the most beneficial in such mixture, which after remaining for ten, fifteen, or more hours, in order to take on the saccharine fermentation and become a little warm, will be found to be a most admirable food, not only for promoting the milking, but also the fattening of the cows, the cutting the hay and blending it with the grains, being greatly useful and advantageous. The latter sort of such grains have a pasty kind of appearance in consequence of being chiefly composed of the meal of buck wheat, barley, or some other such materials used by the distillers; which being blended with fine sweet rouen hay properly cut, that has sweat but little, and acquired a sort of clamminess, the whole has something of the smell of new-made hay; and the hay being cut somewhat less than two inches in length, the cows are under the necessity of chewing, masticating, and reducing the food well in eating it, so as to unite the saliva, or secretion of the glands of the mouth completely with it, by which it becomes the most useful and proper food for the purpose, the whole of the virtue and goodness of it being thrown out and afforded to the cows. It has been known to increase the milk to nearly double the quantity of the usual modes of feeding cows. In this manner of preparing the food and giving it to the cows, there would, however, be a little more expense and labour, but which would not be very material if performed in the best manner.

Any sort of grains, if not mixed in this manner with hay of these kinds, is found very inferior as food for the keeping of cows; and even feeding with brewers' grains, turnips, and cut meadow hay, does not by any means come up to it. When the cows are fed with grains of this last sort for some length of time, they are considered as liable to have their constitutions much exhausted, impaired, or wholly destroyed, and few cow-keepers, on that account, will buy such cows. Even when such grain-fed cows are bought in, in order to be put to grass or for the purpose of grazing, it very rarely happens that they will become fat, though they may seem in a thriving condition when so bought in. The cause of which, in the opinion of those engaged in the killing of such beasts, is that the internal parts of them, such as the inner surface of the stomach, is become thin from the effects of the grains on it, with considerable affection of the lungs, liver, and kidneys, they being often greatly corroded, and injured in their different parts; and the same appearances not unfrequently take place also in oil-cake fed beasts. These forcing sorts of food are, therefore, supposed to act too strongly upon them if continued for any great length of

time, however they may feed or fatten them at first.

The practice of flushing the cows, or making them suddenly give a large quantity of milk for a time, as is occasionally done, by letting them have as many grains of this kind as they will eat, though it may succeed in producing the desired effect, soon afterwards causes them to loath them, and they then fall off in their milk for a time; which proves that it is a very hurtful custom. It is, consequently, necessary for the cow-keeper to be cautious in not over feeding with such grains, but to use hay more freely. For though such grains are cheaper food than hay, and for a time produce more milk, yet, as when given too freely, they are liable to clog and become nauseous to the cows, they should not be too much forced upon them, as great future harm may be thereby sustained. Such cows as are fed in the autumn with these grains, hay, and pasture grass, do not always get fat or into condition, several of them becoming poorer than before; turning out to be of little value for any use; and thus causing much loss in many cases to the breeders and rearers.

The feeding cows for milk, with good sweet hay not too much sweated, and pasture or cut grass, together with grains from the brewhouse, would doubtless be productive of much milk, and if well managed, and used in moderate proportions, would not be a very expensive sort of keep, while much juicy matter, in the state proper for augmenting the milk secretion, would be daily thrown into the system.

PASTURE GRASS.

In the summer keeping of cows, pasture grass has the advantage of cheapness, there being no extra expense upon it, while cut grass has several charges for labour and other matters connected with its application; though the latter goes much farther on the same extent of land, which nearly, if not wholly, makes up the difference. It has certainly been found very beneficial, in many experiments concerning cow-keeping, for milk in the country as well as near town. Pasture grass with a little hay is not only a very cheap, but a very healthy, sort of keep for milking cows.

TARES.

Tares are excellent keep for milking cows in the spring and summer seasons; but in the manner they are usually cultivated and given to the cows, they will be found in general far too expensive, especially where they are, as in most cases, necessarily brought from a distance to the milking places. When joined with red clover, they are probably still more beneficial in the way of producing milk, but the loss which is sustained in the root parts of such crops, when full on the ground, renders them an expensive sort of keep for this purpose. Such parts, under such circumstances, constantly take on a sort of yellowness and putridity, which cause the cows to reject them, and the top parts become equally bad if left too long in heaps, especially when in a rather moist state, by which much waste is produced. On this account tare crops should therefore be grown in connexion with some sort of grain plants; such as those of the oat, winter, or common barley, that may support and keep them up without causing them to be too thick on the ground, or inducing them to throw out more lateral fibres, or to feather more fully towards their bottom parts, by which method a much more abundant quantity of keep will be produced on a given extent of land.

Green food, such as cut tares, clover, and natural grass, with a little dry fodder of some

kind, is a very good sort of keep for milch cows in the summer season, and if well managed, not very expensive.

It has been proved by various accurate calculations, that a greater profit is capable of being derived from the keeping of the animals in the house, than in the usual method of allowing them to feed in the pastures: and it has been remarked, that by keeping cows upon red clover and rye-grass, tied up in the house in the day-time, during the summer season, and putting them out after milking, in the evening, for the purpose of air and water, one acre of clover has been found to go as far as two when pastured, besides a larger quantity of milk being afforded. The large portion of rich manure that is made in this way, is supposed to compensate for any additional trouble and expense that may be incurred in cutting the food and conveying it to the yards. In this method of keeping cows, as well as those with grains and other sorts of succulent food, it is constantly necessary to combine some sort of dry meat, such as hay, straw, or other similar materials, with the grains. In soils where lucerne can be grown to advantage, it may be made use of with more benefit than the above mentioned grasses; and, by combining other sorts of green juicy food with either of them, it seems probable that a still greater profit may be produced. Of the superior advantage of keeping milch cows in this method, there can be little doubt, when considered in different points of view. Much advantage has been found to result from soiling cows for milk in many cases, as it makes them give large quantities for a great length of time, and of a fine quality.

It would appear, that in the different combined modes of feeding and keeping cows which have been stated, when regulated, managed, and attended to in the best manner, the expense rises to from ten to fourteen shillings and upwards, in the week, for each cow, according to the nature of the substances used; which, with the other expenses, attendance, and other articles, which amount to nearly the same, render the business of cow-keeping considerably expensive in carrying on; and leave much less profit than formerly attached to this species of farming.

But, though this may in some measure be the present situation of the cow-keeper, in consequence of the price of all the articles used as keep for cows; and other expenses in conducting the milking practice having risen in amount, so much more in proportion than the value of the milk produce of the animals; it is not possible to suppose that the business would be continued and carried on under circumstances of any great real loss; and yet we find many cow-keepers, who, notwithstanding such circumstances, think it the best method of turning grass land to account, that can be adopted in the neighbourhood of the metropolis.

If the case were otherwise, it is not to be conceived that the vast consumption of milk in that place could be provided for, as the small milk dealing cow-keepers could never be capable of providing it, however much their profits might be increased by different means which they have at hand; or however great an advantage they might have by doing much of the business within themselves: nor could it under any circumstances be done by them equally well, and to the same advantage for the public. It is, in all probabily, therefore, only by the large cow-keepers, that the proper good and adequate supply can be constantly kept up, however small their profits may be.

But it is probable, from the continually fluctuating nature of the cow-keeping practices in the stock, as well as the produce in milk and

other ways, that no very correct statements can be arrived at as to the exact profits of them, as they would certainly not be continued if there was an absolute and continued loss attending them.

There are many circumstances and points in the practice of the cow-keeper, which tend to render it uncertain and hazardous, besides, those that have been already noticed; such as the difficulties and disadvantages of keeping up the stock, so as to afford constantly the necessary supplies of milk; the gradual lessening of the advantages which they afford; the great loss on their keep after they begin to decline till they can be sold; the little value of them in the market, and various other losses, which are almost continually taking place.

Under all such difficulties and disadvantages, however, the most profitable method of practice is to keep them in the most plentiful manner with different sorts of good food, whatever its nature may be, which produces the largest portion of immediate advantage, while nothing is to be expected from deficient keep of any kind in whatever way it may be administered; and in cases where the cows in such high keeping do not get into full fat condition, but become again in the state for milking, care should constantly be taken to have them disposed of at whatever price they may produce; and replacing them by others, as cows so fully fed almost always gradually fall off in the quantity of their milk, a circumstance attended with great loss and inconvenience in this branch of cow-keeping.

Thus, as the stimulus of the high and forcing keep, which is necessary in the practice of foddering cows for the purpose of producing milk for sale, soon wears out their constitutions, and causes them gradually to fall off each year in the quantity of their milk, as well as in flesh, (though the large Yorkshire milking breed stand it much better than any other sort,) such a practice as the above becomes quite necessary; for they seldom go on well under such management for more than two or three years at farthest, as they often become particularly delicate in their habits, and are very liable to become lamed and injured in their feet, knees, udders, and teats, as well as other parts, by standing and resting on them; and by their over distention and pressure in lying down, as well as by other similar causes.

But in order to render the cow-keeping practice of the metropolis, or other large towns, more complete, and fully productive and advantageous, in every point of view, it is essentially necessary to provide proper dry sheltered and littered yards for the cows lying and resting in on the winter nights, that they may enjoy most of their natural habits, which is so greatly important and beneficial in these cases; and which accommodation it is by no means difficult to procure for them if once the subject be fairly taken into consideration by this class of cow-keepers.

MILKING THE COWS.

This is a practice in cow-keeping upon which a great deal more depends than has commonly been conceived to be the case; as unless good, regular, and clean milking be constantly attended to, there will not only be a vast deficiency and loss in the quantity of milk sustained, by the more than usual decline and falling off in the cows, but by their becoming much sooner dry and more liable to be injured, in many other ways, as in their udders and other parts. These are great inconveniencies and disadvantages, that, with many others arising from the same source, greatly diminish the profits of the cow-keeper; but which, however

detrimental they may be, are not to be easily guarded against or avoided so long as, to save trouble and expense, it continues to be the custom for those who purchase the milk to perform the process of milking the cows that supply it, however unfit they may be for the purpose; which puts it out of the cow-keeper's power to prevent the several mischiefs, injuries, and inconveniencies that arise in consequence of such a system. The safest and most proper practice, with a view to profit, would in all cases probably be, that the cow-keeper should have under his own direction a set of persons perfectly acquainted with the nature of the work, for performing the operation of milking; and that the purchasers of the milk might be perfectly satisfied, and have no reason to complain, they might be allowed to be present during the time of the milkings, and take the milk away immediately afterwards.

Such a plan as this would probably be as little, if not less, troublesome to the cow-keeper, than that which has been so long in use, while it would secure to him every advantage that could possibly be gained, without so much injury to the cow stock as is the case in the present manner of conducting the business. The expense attending this more correct and beneficial manner of milking might be charged upon the milk itself, as the expenses of the dealers would be lessened in nearly the same proportion, and thus no loss could probably accrue to them.

Another way in which this kind of work might be equally well performed, would be by the milk purchaser being obliged by the cow-keeper, in all cases, to find and provide such persons as are in the habit of milking, and who are familiar with the nature of the process, and the method of executing it in the most proper, advantageous, and careful manner. That such is far from being the case in general at the present time is sufficiently evident from the many instances of the loose and irregular ways in which it is now performed, in consequence of the want of proper knowledge and experience of the correct and proper modes. The nature, uses, and methods of proper milking, under different circumstances, have been already considered when speaking of the *Cow;* as will be seen under that head.

MILK.

This produce, according to the long custom of the cow-keepers of the metropolis, is constantly given to the milk dealers in the pure state; and in the quantity of the double gallon, or that of eight quarts to each gallon, which affords them a very great advantage in their profits in the sale of it over the cow-keeper; besides which, they mix it with different other fluid matters, which in many cases are said to amount to a fourth or fifth of the whole; and must of course yield very considerable profit over and above that which is drawn from it in the first instance, though the milk is thereby rendered less useful for many purposes.

Those small cow-keepers who combine that practice with the business of milk-dealing, have the means of gaining perhaps still more profit, as they have the conducting of the whole of the employments themselves to the best advantage, and with the least expense; but as they have seldom more than a few cows, it can rarely be done by them to any considerable extent in proportion to the immense consumption of milk which is necessary.

At those seasons of the year, when there is a greater quantity of milk than is wanted for sale, the over quantity is sometimes set by and creamed for the making of butter; but this practice does not much prevail in this milk

system, though in such cases the butter-milk turns to much advantage as well as the butter.

In all kinds of cow-keeping for dairying, whether the intention be milk, butter, cheese, or any other product, a proper place for the purpose is absolutely necessary.

Section XIV.—*Dairy-houses.*

It has been observed by an able, experienced, and practical manager, that no dairy can be carried on with profit, unless a place properly adapted for keeping the milk and conducting the different operations that are necessary be first provided. In houses of this sort some variation will be necessary, according as they are milk, butter, or cheese dairies. A milk dairy requires only a good milk-room, and a room for scalding, cleaning, and airing the utensils. A well-constructed butter dairy should consist of three apartments; a milk-room, a churning-room, with proper boiler, as well as other conveniencies for scalding and washing the implements, and a room for keeping them in and for drying and airing them when the weather will not permit of its being done without doors. A cheese dairy should likewise consist of three apartments; a milk-room, a scalding and a pressing room, and a salting room; to these should be added a cheese room or loft, which may with great propriety be made above the dairy.

The necessary requisites of a good milk-house, in whatever view, are that it be cool in summer and warm in winter, so as to preserve a temperature nearly the same throughout the whole year; and that it be dry, so as to admit of being kept clean and sweet at all times. For these reasons, a northern exposure is reckoned the best, and as much under the shade of trees or buildings as possible; if it can be so situated that the sun can have no influence either on the roof or walls, so much the better.

As it is, on most occasions, difficult to contrive a place within the dwelling-house that possesses all these requisites, it has been advised that a separate building should always be erected, which may, in every situation, be erected at a very small expense, and made to answer the purpose much better than any of those costly structures often built by noblemen and gentlemen for this use. This building, according to the plan suggested, ought, if possible, to be erected near to a cool spring or running stream of water, where easy access can be had to it by the cows, and for other uses, and where it is not liable to be incommoded by stagnant water of any kind. It should consist of a range of narrow houses or buildings. The walls of the milk-house, or of the middle building, should be raised of brick, or of stone and lime, all round the inside; this wall need not exceed in thickness one brick in length, or, if of stone, about one foot in thickness; beyond that, the wall, which should be full six feet in thickness, should be made of sod on the outside, and earth rammed firm within. The inside wall of this building should be seven or eight feet high on the sides, on which should be placed the couples to support the roof, and the walls at the gables carried up to the height of the couples. Upon these should be laid a roof of reeds or thatch, that should not be less than three feet in thickness, which should be placed downwards till it covers the whole of the walls on each side. In the roof, exactly above the middle of the building, should be placed a wooden pipe of a sufficient length to rise a foot above the roof, to serve occasionally as a ventilator. The top of this

funnel should be covered to prevent rain from penetrating through it, and a valve fitted to it, that, by means of a string, may be opened or shut at pleasure. A window should also be made upon one side for giving light, and this aperture should be closed by means of two glazed frames. The use of this double sash, as well as the great thickness of the wall and of the thatch upon the roof, as also of the buildings at the ends of it, is to render the temperature of this apartment as equal as possible at all seasons of the year, by effectually cutting off any direct communication with the external air. One of the corner buildings should be employed as a repository for the utensils of the dairy and a place in which they may be cleaned and kept in order, to be ready when they are wanted. For this purpose, ranges of shelves should be placed all round the walls, and tables and other conveniencies fixed where necessary. Here the walls may be thinner than the other, and built wholly of brick or stone: nor is there a necessity for having the thatch so thickly laid on as in the middle division. In one corner should be placed a caldron of a convenient size proportioned to the dairy, for warming water to scald the vessels over a close furnace, the flue of which should terminate in a chimney carried slanting over the door in the gable, above which it should rise upright and then emit the smoke.

The other apartment, or division, may be employed as a kind of store-room in which the cured butter and other products of the dairy, and the spare utensils, may be deposited. If the dairy be situated so near a town as that ice could be disposed of with profit in the summer, this apartment may be converted into an ice-house, which, on many occasions, would be a very convenient appendage of the dairy. In this case the walls and thatch should be as thick as those of the middle division. Firm posts of wood ought to be placed in the floor so as to form an inner square, with an open walk all round of two feet in breadth. Within these posts should be placed hurdles of a convenient shape, formed of wicker-work; the wands of which they are made having been all peeled and previously dipped in warm coal tar to preserve them from rotting. Within this square is the space allotted as a receptacle for the ice; and when filled, the doors should be closed and the aperture between them filled with straw rammed firm to prevent the admission of air: the ice to be taken out occasionally through the milk-house. Many would be the conveniencies the dairy would derive from this accommodation, and small the expense; for by these means the products of the dairy could be always cooled to the degree in summer that should be found to give them their greatest perfection. Other advantages might occasionally be derived by the attentive farmer from this easily-obtained accommodation.

Where cheese is the principal object of the dairy, another additional room, somewhat differently constructed, would be wanted, for the purposes of pressing and salting the cheese.

The passages, which are merely cavities formed in the thickness of the partition wall, may be employed for any use that shall be found necessary: here must be double doors to cut off all communication between the external air and the milk-house, and the thatch above these small apartments ought to come one foot lower within than in the milk-house. Through all the doors should be an aperture of about a foot square, having a small door exactly fitted to it, which may be opened and shut at pleasure. Over the inside of each of these apertures should be stretched a piece of fine gauze, covered with a fine netting of wire; so that, when

the air is temperate and the wind blows in a proper direction, by opening these little doors, a draught of air may be carried through the whole of these buildings, that will keep them quite sweet and dry without admitting flies or other vermin.

The milk apartment should be paved with flat stones, that should be raised six inches higher than the surface of the ground without, having slanting gutters, readily to convey water or any other liquid that might be accidentally spilled thereon. The walls all round should be lined with shelves of a convenient breadth, in ranges one above the other, on which the dishes may be placed; and in the middle should stand a large table, which, if made of stone, will be found to be more clean and convenient than any other material. Beneath it a piece of the pavement, about a foot in breadth, should be raised six inches higher all round than the level of the floor, so as to form a trough within it for holding water. This basin may be emptied entirely at pleasure, by opening a hole that allows the water to run into the common gutters. The intention of all these contrivances is merely to enable the owner of a dairy to keep his milk in a proper degree of temperature, both during the summer and the winter season, without much trouble or expense; for any considerable variation in the degree of heat tends greatly to derange his operations, and to diminish the value of the products of the dairy. If the heat be too great, the milk suddenly coagulates, without admitting of any separation of the cream, and it is so suddenly rendered sour as greatly to mar every operation. If, on the other hand, the milk be kept in too cold a temperature, the cream separates from it slowly and with difficulty; it acquires a bitter and disagreeable taste, the butter can scarcely be made to come at all, and when it is obtained is so pale in the colour, so small in quantity, so poor to the taste, hard and brittle in consistence, and of so little value in every respect, as to bring a very low price in the market, compared to what it would have produced had it been preserved in a proper degree of warmth. To avoid, therefore, as much as possible, both these extremes, the milk-house should be in the centre of the building, into which there is no access directly from the open air; nor even from the porch, but through a double door, one of which ought to be always shut before the other be opened, when either the heat or the cold of the weather is excessive; though at other times this precaution may be omitted. But as dairy-houses are erected on different plans, the size should always vary according to the number of cows. It was found, in Gloucestershire, that one for forty cows required twenty feet by sixteen, and one for one hundred, thirty by forty. The North Wiltshire dairy-rooms have in general outer doors frequently opening under a pent-house or open shed, which is a great convenience, affording shade and shelter, and giving a degree of coolness to the dairy-room.

In particular instances, double doors have been noticed, such as a common close-boarded door on the inside, and an open-paled gate-like door on the outside; giving a free admission of air in close warm weather, and at the same time being a protection against dogs and poultry—a convenience which would be an improvement to any dairy in the summer season.

SUNK DAIRY-HOUSES.

Dairy-houses may be formed in dry situations at much less expense than the above described, containing suitable apartments for the different operations, by having them sunk some depth in the ground and vaulted, with

an easy inclining pathway, or range of easy steps to descend by on the coolest side. Such dairies would be, in general, equal in temperature at all seasons, and, under most circumstances, may be the most cheaply formed. The danger of damp should be particularly guarded against, by suitable drains and openings made quite round them; as wherever damps occur they cause a sort of fustiness, which is very injurious in such places. There should be different rooms, as above described, neatly constructed, and fitted up in a manner suitable to the uses for which they are intended, the windows and other openings being made of finely-wired materials, so as to freely admit the air, and at the same time to exclude flies and all other sorts of vermin. The frames of the doors should be of stone, the walls being of considerable thickness, and well stuccoed or tiled on the insides, at the ends of which small arches or places for the standing of vessels that are to contain the several products are to be fixed. There should be strong shelves or benches all round the milk-rooms, supported by brick-work or stone pillars, in or on which the pans or skeels for containing the milk are to rest. The sweetest and best sort are those of glazed earthenware, which is formed from a sort of thick slatey marble; the contrivances lined with lead, and used so much, being unsafe, except when kept perfectly clean and free from that sort of furring which the great action the acid of the milk has upon the lead. In butter dairies, besides the conveniencies just noticed, there should be places and contrivances for churning, and scalding the different vessels and other necessary articles, and a sort of horse or hooked convenience for hanging them upon in the open air, to render them quite sweet and dry. And in the cheese dairy, besides other necessaries, there should be a cheese-press properly fixed up, of sufficient power for all occasions; and a proper drying-room, into which neither the sun or wind can enter: as when that is the case, the cheese, in drying, often runs or slips its coat, as it is termed, yielding a bad smell, in consequence of which flies are apt to drop their ova in such parts, and produce additional mischief. Light should be admitted by a window placed towards the north. A kind of stout bench is also necessary in the middle of such room, to rub and dress the cheese upon, with shelves firmly fixed round them against the walls, having a sort of frames or racks made properly to suit the thicknesses of the cheeses, resting on tapering feet downwards to the floor, and covered with tin to prevent the entrance of destructive vermin.

In dairies formed in this manner, it is not improbable, but that the milk would throw up the cream more quickly, on account of the temperature being less variable, and perhaps in larger quantity from the same amount of milk, which would be greatly advantageous. It is the common opinion, that milk should not be put by for standing to cream until it is become quite cool, as it does not throw up the cream so well when set by in the warm state; this opinion, however, appears to be very erroneous, as in an equable temperature, the cream rises in a more favourable manner, and the matter has lately indeed been fully proved by accurate practical trials. With this view, therefore, such sunk dairies would be greatly useful; and they are further beneficial, by preventing wind entering so freely as in other cases, for by its repelling, drying, and toughening the surface parts of the milk and cream, it causes them to produce a less quantity in a given length of time. Cream, when so much dried and toughened by wind, never affords so much

or so well-flavoured butter. Stagnant or even too much running water in dairies, is also prejudicial to the products which are there formed; the former by the noxious smells that are thereby occasioned, and the latter, when the creaming vessels are placed in them, checking the throwing up of the cream, and by impairing the fineness of the flavour of the butter; therefore, however they may tend to cool dairies, they should be cautiously made use of in such places. As cream is constantly much disposed to run into the state of fermentation, dairies of this equal temperature must greatly tend to increase the quantity, improve the quality, and preserve the flavour, of butter.

In forming the walls of dairies, stone is always to be preferred to brick, as being less easily penetrated by the rays of heat in the summer, and the cold in the winter season. It is necessary to have the ceilings of the rooms in dairies rather high and well and closely plastered, the windows reaching to their upper parts, and well wired, or latticed in a neat manner, with thin gauze canvass tightly stretched over them, for the free admission and circulation of air, and preventing the entrance of flies and other vermin. The floors should be laid smoothly with some sort of stony material, having a pump at hand for washing them with when necessary, as well as for other uses, which should be so disposed that the water may run off readily into some place set apart for the purpose. The milk vessels, coolers, or cisterns, should be in proportion to the size and business of the dairies, and not made deeper than about three inches, as by that depth the cream is thrown up in the best manner. They may be formed of any slatey or other suitable material, and be properly furnished with plugs and cocks for letting off the milk and washing and cleaning them, the walls at the backs of them being covered with Dutch tiles. In cheese dairies, the rooms for the storing them in should be in situations so as to have a moderate warmth at all seasons, as that is supposed to be the most favourable to their ripening properly.

Section XV.—*Cow-keeping, or Dairying for Butter and Cheese.*

In every sort of dairying there are a great number of different matters and points particularly necessary to be nicely and exactly attended to and understood, and especially in those of butter and cheese making.

CIRCUMSTANCES TO BE PARTICULARLY ATTENDED TO IN THESE PRACTICES.

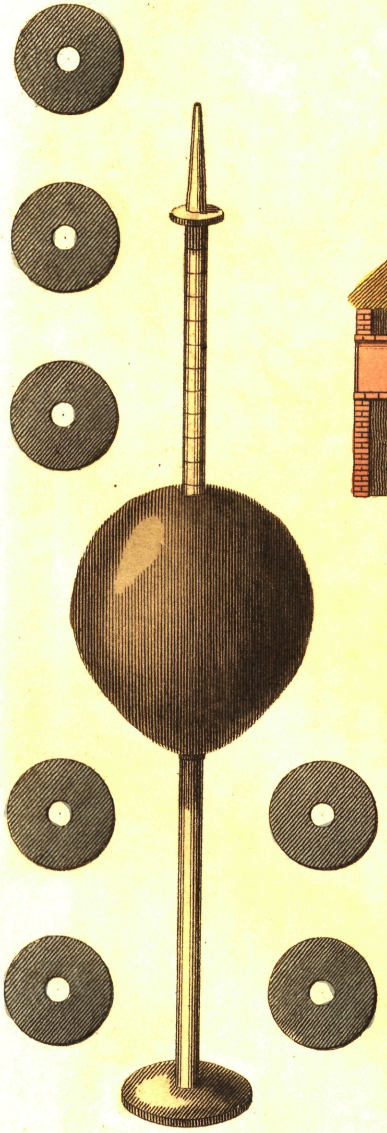
These include every thing which relates to the state of the vessels and utensils, the pastures, cows, their keep, milk, milking, cream, and creaming, colouring and forming the different products, and a variety of other particulars.

CLEANNESS OF THE UTENSILS AND VESSELS.

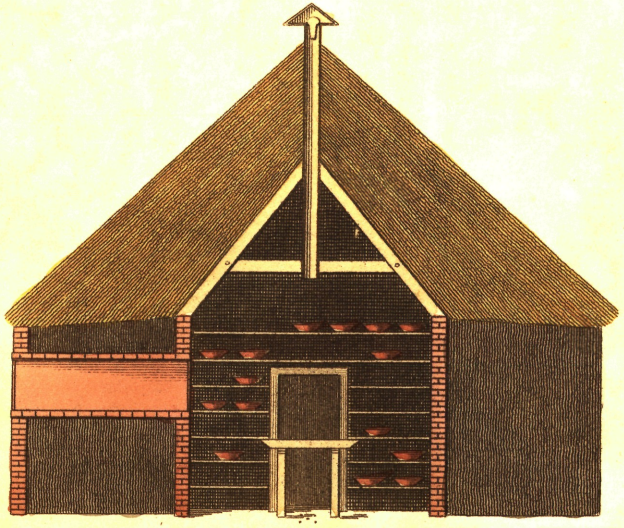
In all sorts of dairy vessels and utensils for whatever purpose and use, the utmost cleanliness and sweetness is absolutely requisite. They should be well prepared at first, by having water strongly heated, standing some time in them, and be then carefully rinsed out and exposed to the open air. And again, after every time using them, be as carefully soaked, washed, and made perfectly sweet, by drying and exposure in the open air. It is always proper to have the pans, dishes, bowls, sieves, and other vessels, whether they be formed of earthen ware, wood, or other substances, rendered clean and sweet by boiling, or soaking

DAIRY BUILDINGS & APPARATUS.

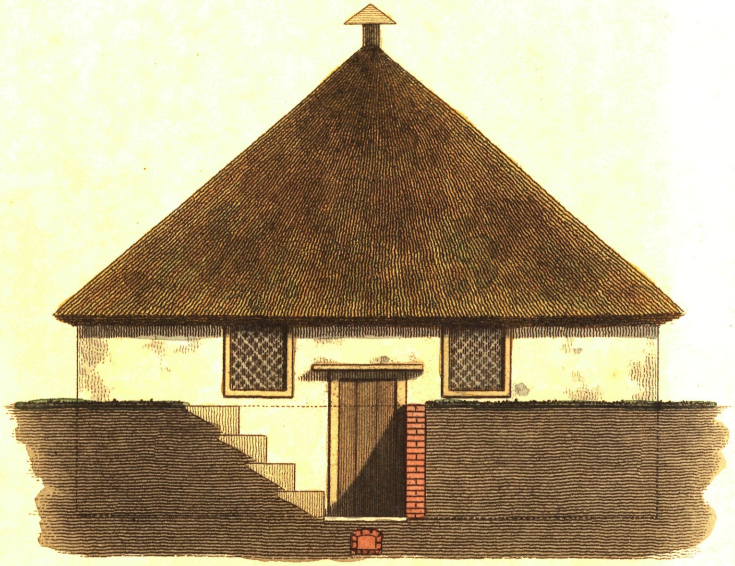
DIFFERENT WEIGHTS USED SINGLY.



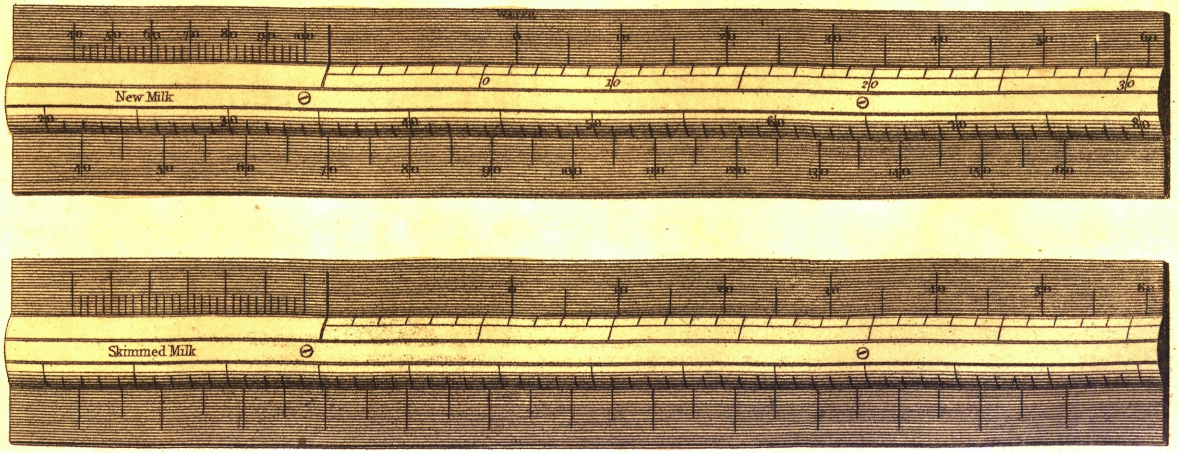
DIFFERENT WEIGHTS USED SINGLY.



RAISED EQUAL HEATED DAIRY HOUSE.



SUNK EQUAL HEATED DAIRY HOUSE.



INSTRUMENT FOR ASCERTAINING THE QUALITIES & GOODNESS OF MILK.

London Printed for Thos Kelly 17 Paternoster Row July 1823

them for a length of time in suitable large vessels filled with very hot water, as such scalding is very powerful in removing the cause of any rancidity or bad smell that they may have contracted; and afterwards, when taken out, they should be wiped quite dry and exposed to the air, and be again well rubbed and washed just before they are used. In cleaning some of the wooden vessels, the leaden or other coolers, and all such as are subject to contract a sort of putrid state in consequence of the stagnation and furring of the matters which they may have contained, and then being deposited on their surfaces, or in their crevices and corners, the carbonate of lime would probably be found an excellent substance, as possessing great power in correcting such fetid taints, and as being well suited for application and use in such cases, though the more coarse and round kind of salt is usually employed for the purpose. By making use of the carbonate of lime, once or twice only in the week, a perfect state of sweetness might be easily and conveniently preserved in the vessels, such perhaps as has never yet been the case. In consequence of the high degree of glazing in the earthen vessels of the dairy, they are mostly capable of being kept clean and sweet, simply by being well scalded with sufficiently hot water. The cleaning of every sort of dairy vessel and utensil well in this manner, will render them capable of preserving the milk longer sweet, as well as make the general work of the dairy proceed more favourably.

In some places tin has been introduced, for the purpose of forming trays for holding milk, being very cheap, convenient, and readily made sweet by scalding; while they are more wholesome than some other kinds, the cream rising equally quick, well, and thick in them.

PROPER LANDS AS PASTURES FOR THE DIFFERENT PRACTICES.

In the management of the dairy, in these intentions, there are some kinds of pasture lands that are more suitable, and answer better and more profitably than others. The inferior sorts of feeding pasture grounds, and those of the low warm meadow kind, which cannot fatten to perfection the larger breeds of neat cattle, may be beneficially converted to this use, whilst high, exposed, and unsheltered lands are quite unfit for it.

The nature of the land for pasture and the kinds of other food, which are to be most readily obtained, will best direct to what extent, and in what particular articles, the dairy business may be most profitably conducted. But where such lands are of the older sward kind, and in a medium state of fertility, butter should probably be the main object; while in cases where the grounds have but lately been changed into the state of pasture grass, and are more cool and less fertile in their qualities, the chief article should be cheese. In some particular cases and circumstances, though in but few, the two practices may be combined and carried on at the same time with more advantage and profit than either of them singly.

Long experience and practice have fully shewn the above to be really the case, as they have proved that the first of the above sort of pastures are mostly productive of that kind of milk which abounds in the oily material or cream; while those of the latter kind, are productive of milk, in which the caseous or cheesy material is the most abundant. And the trials in old grass land districts, which have lately been ploughed up and improved by calcareous and other manures, have given further proof, that such old sward pastures have not only the property of affording the oily or butter material in

larger quantity, but of rendering the butter itself of a firmer and more close texture. But though the above may often be the case in such sorts of pastures, there can be no kind of doubt, but that both good butter and cheese may frequently be made on each of these descriptions of pasture lands, as well as from the milk of cows fed on cut natural or artificial grasses of different kinds.

It is probable that the difference in the profits from these two different sorts of dairy management is not on the whole very material, as the valuable products afforded in each case may now be reckoned at about eight pence the gallon of milk; yet in many places, and especially in, and near large towns, the milk and butter dairying must have the preference to that of cheese. The extent of the profits in all these cases must of course, in a great measure, depend on the care and attention which are bestowed on the different practices in managing them.

SORTS OF COWS MOST PROPER.

After proper dairy-houses, as above, have been prepared for the different purposes, and suitable utensils, in addition to those already noticed, procured, such as churns, milk-pails, sieves, milk-ladders, cheese cloths, and vats; it will then be necessary to provide such cows as are the most suitable and proper in the different intentions, and such as are best adapted to the different circumstances and situations. As some cows give thicker and richer milk than others without any relation to the quantity of it, or reference to their sizes, these points should be particularly regarded in these practices. In selecting cows for butter, the quantity and quality of the cream thrown up from the milk in a certain time should rather be attended to than the amount of the milk itself: while in cases where cheese is to be produced, the quantity as well as the quality of the milk should be equally a matter of consideration with the dairy-man. Those cows which give thick milk should always be preferred by those who are in either of these practices, but especially those in the former. The milk is constantly thinner soon after calving than at some distance of time afterwards, mostly becoming gradually thicker and less in quantity.

On the better and richer sorts of pasture land, the larger breeds of cows will generally be found the most advantageous in the intention of butter and cheese: while on those of inferior qualities, the smaller and less heavy breeds may be more useful and profitable in such practices. Sometimes a mixture of the smaller breeds answers better than any one single breed of such cows.

The mixed breeds of cows are also on some occasions found very useful in these intentions.

In so far as butter and cheese are concerned, perhaps, no sorts of cows have the advantage of those of the Suffolk kind; as in many extensive dairy-districts cows of this kind are to be found in the largest dairies, that in the two first summer months give eight gallons of milk in the day; and in the whole of the three summer months the whole of the cows of dairies of from forty to sixty in number give four gallons each in the day; yet they are an awkward ill-shaped sort of cows. The Sussex, improved Lancashire, and some of the Kiloe or Scotch sorts, are also cows, which for butter are excellent in many respects. But whatever sorts of cows are employed, they should always have a sufficient degree of hardiness to stand the nature of the situation in which they may be placed. *See Milk, Breeds of Neat Cattle, and Cow.*

KEEP OF THE COWS.

In the producing of milk, where abundance and goodness of quality are material, the nature of the keep of the cows is of much importance, as it should always be good and plentiful. The best summer sort in such intentions, is that of pasture grass, where the lands are firm, dry, and fertile. Where the circumstances of the situation and exposure are such that the cows can feed at ease without injury at this season, during the day-time, they should be permitted freely to range on the pastures; but where they are much injured or inconvenienced by the heat, or other causes, so as not to be able to pasture on them in the day, they should in such cases be taken into cool sheds or open buildings, in order to be protected; where after they have been allowed to ruminate for some time, they should be well supplied with food of the green kind, cut fresh and fresh for the purpose, so as to induce them to eat it as abundantly as possible. They should be turned out again into the pastures when the heat of the day is over, and they can feed with ease and benefit, continuing to range and pasture freely during the whole of the night at such summer periods. There is a great similarity in the summer management of cows, with these intentions, in most districts of the kingdom. It is the usual custom to turn them upon the oldest pastures, in which, when they are at some considerable distance from the homestead, they are milked; but in most other cases they are brought home twice a day or oftener for that purpose.

In the winter keeping of the cows, those which do not give milk, are fed with straw in the yards; but those that are in milk, or which are near calving, are put in some good close pastures, or in sheds made for the purpose, and kept for the most part on hay, or other such food. But in cases where different sorts of artificial grasses are grown and raised for this use in sufficient extent, such as tares, clover, rape, turnips, cabbages, beets, parsnips, potatoes, or other kinds, the milking cows have commonly a certain daily allowance of food throughout the whole of the winter and spring months, which is of vast advantage in increasing the quantity of milk. It is, of course, always greatly for the interest of the dairy-man to have his cows well and attentively fed with such kinds of food at all times and seasons of the year.

The several kinds of food for cows, in these dairy practices, may be arranged somewhat in this manner for their summer and winter keep.

The keep in summer, *natural grass-pastures, mown natural grass, rape, red clover, tares, lucerne, saintfoin, burnet,* and such like. In using the rape and clover, much attention is necessary, to guard against injury to the cows, and to the quality of the products of butter and cheese which they afford. The tares and lucerne may be employed in any way, but are the best and most profitably used in the soiling manner, as where the cows, in such cases have a due degree of shade and plenty of water, they are very greatly useful, as they yield a very full supply of meat, and produce much milk of a good quality, where proper care and attention is bestowed in the foddering. A middle-sized cow has been found to consume in the proportion of from about sixty to one hundred pounds weight of them, in the green state, during the day and night. The two last articles might be highly beneficial in these dairy practices, where the land is of a chalky and hilly nature.

The winter keep, *hay, straw,* or a *mixture of them, tares, cole, turnips, cabbages, beets, carrots, parsnips, potatoes, brewers' grains,* and other such

substances. But as hay is in most places a too expensive sort of keep, in these practices, and straw in its genuine or mixed state does not by any means fully answer the purpose; with the view of rendering the former less chargeable, substances of the green and root kinds as above, are mostly combined with it. The cows, until nearly the time of calving, may be well kept on newly-thrashed straw in the yards, beginning with that which is the most inferior in quality, and gradually proceeding to that which is of the best kind. While it is of the first of these sorts, the cows most in condition should have it alone; but those that are in not so good a state of flesh, but of valuable kinds, should have joined with it a feed of turnips, cabbages, or some other sorts of roots or plants once a day at least: and as they approach the calving time, be supplied with a little hay, or have the green food or roots increased, both being fully given afterwards. Cabbages, with a view to milk, are very excellent, if the dead and decayed parts be carefully picked away; as the quantity of food afforded is large in proportion to the extent of land on which it is grown. A cow would consume a very large quantity of this sort of food in the day, but sixty or seventy pounds with the straw is as much as ever can be paid for by the produce in either butter or cheese. In some trials, middle-sized cows have been found to consume twelve stones of such food in the day. The great difficulty with turnips as food in these cases, arises from their imparting a bad flavour to the butter, which cannot be easily corrected, as they promote the milk in a high degree; and without them or cabbages, large dairies in most situations cannot be profitably kept. The consumption of turnips is larger than that of cabbages in the same space of time.

Roots of the carrot, parsnip, beet, and potatoe kind, may often be very beneficially employed in this way; but even where they are grown in sufficient quantity, they can only be used with profit as a feed, once or twice a day with the ordinary food.

From some very interesting trials made lately upon a large scale, by a distinguished and very intelligent nobleman in Sussex, with this view it would seem, that potatoes, whether boiled or used in the raw state, are a very bad and improper food for cows, hay or cut chaff being employed as the dry meat. Ten cows being fed on potatoes and hay, and other ten on hay alone, for a month, the former ten wasted much, but the latter ten kept themselves in good order: the difference in the quantity of the milk not material; boiled potatoes and wheat chaff not more satisfactory; and when steamed, little better. Ten cows on being put upon raw potatoes and hay, and an equal number on carrots and hay, for the space of a month, those on carrots and hay did much the best; those on potatoes and hay being reduced so low, though plenty of the latter was given them, that the consequences might have been very bad had they continued longer on such food. When tied up to raw potatoes and hay, a change of food became absolutely necessary in the course of three weeks. When used with chaff, each cow had three pecks of boiled potatoes, mixed with wheat-chaff. On ten cows being put on carrots, and ten on potatoes, the former root kept them in a hearty state: the food in nowise affected the flavour of either the cream or butter. Cole or rape is an useful sort of food with these intentions, whether mown and given in the yards or eaten off in the field, especially when employed in succession to turnips in the spring months, and grown on firm dry sorts of land. And the grains of the brewer, when to be had in plenty,

are extremely beneficial in connexion with the other sorts of fodder, as causing much milk, though not of the best quality; they are consequently more useful in the milk dairy simply, than in those of butter and cheese. Soiling with various sorts of green food in open sheds in the yards, and giving with them some kind of dry meat, as in cow-keeping, may often be very beneficial in producing milk as well as butter. *See Soiling.*

Long experience has now fully proved, that whatever sorts of green or other food are employed in keeping dairy-cows, that great benefit is produced by letting them be varied and changed as much as possible, which most probably is accounted for on the principle of a new sort of stimulus being the most efficient in exciting and increasing the secretions of animals, and among the rest, that of the milk in cows, as there are many other facts in support of such a conclusion.

FEEDING THE PASTURES.

In eating the grass of pasture lands by cows, with these intentions of the dairy, the great principle or rule is, never, on any account, to let them be fed down in too close a manner; but always to have a good and sufficient bite for the animals. The cows should therefore be constantly put on them in due proportion to their goodness. Upon the better sorts of such dairy-pastures, it may be sufficient to put one rather large-sized cow on the acre, and nearly half for the summer season; while on the inferior kinds of such pastures, one cow to two acres will be quite as much as they will bear in many cases. These sorts of pastures should, of course, be more frequently changed than those allotted for some other kinds of store neat cattle-stock, in order that the former may be on all occasions in as full a state as possible of pasturage; and that the cows may be fully fed and well kept, as on these the quantity of milk and the profits of the products are materially depending.

Cows, for these purposes, while they are feeding in the pastures, as well as when they are tied up or confined in the yards, should always be well and carefully supplied with water, at least at the times when they are milked, if not more frequently.

TIMES OF MILKING.

It is most commonly the custom in dairy districts of these kinds, to milk the cows only twice in the day; but in case they are fully kept and watered, it would most probably be beneficial in the increase of milk, if convenient, to have them milked thrice in the same space of time in the whole of the summer months; as in the morning early, in the middle of the day, and late in the evening. For if, while they have such plenty of rich juicy food and water, they be milked only twice in the course of the day and night, they will afford a much less quantity of milk in the same space of time, than if milked three times as already explained.

The times of milking vary in different butter and cheese districts: in some of the more northern ones, they are in the summer part of the year about six o'clock in the morning and evening; while in some of the midland and more southern dairy counties the business of milking is begun and gone on with from about four o'clock in the morning, so as to be, even in extensive dairies, nearly finished in the whole before it has commenced in those of the north: the evening milkings are also equally early. But probably the most convenient and useful practice is to begin the work from five to six in the morning, and from six to

seven in the evening, as at such times it will be the least interrupted by other business, and be wholly completed before the heat becomes so great as to render the cows restless and uneasy, and when it has declined and become cool. It is best done by bringing the cows home to the farm yard, when the pastures are at no great distance, but in other cases it must be done in the fields or pastures where they feed.

In extensive concerns the dairy-man or some trusty person should constantly attend the milkings to see that the work is properly performed, as well as to convey the milk, which has been occasionally emptied from the pails, as the business proceeds, into proper vessels, to the dairy-house, in order to its being poured through a sieve or strainer into the pans or coolers for throwing up the cream, or into the cheese tub, preparatory to the application of the steep in cheese-making where the cream is not separated.

Much caution is necessary in the choice of proper persons for milking the cows; as if the business be not carefully executed the quantity of produce will be greatly lessened, as the last portions of the milk are so greatly superior to those which are first drawn in their quality: this important business ought, therefore, never to be trusted to any one but well known confidential servants who thoroughly understand it, and who manage the cows with gentleness. It is also an excellent custom for the dairy-woman frequently to examine the cows separately after the milkers have done, with a view of guarding against, or detecting any imposition that may have been practised.

The labour and trouble in these sorts of dairy businesses must of necessity be different in proportion to the differences in the conveniencies and other material circumstances; but a common dairy-woman can rarely undertake the management of more than twelve or fourteen cows in any perfect manner, particularly where butter, as well as cheese, is made, as if more be undertaken assistance will be wanted in the dairy; for as it is proper and useful that the cows should not be much more than an hour in milking, the dairy-woman cannot milk more than five or six in that time; consequently, in a dairy of eighteen cows, two assistants will be requisite at such milking times. The labour of the dairy business is, of course, to be regulated in some such proportion.

It has been practically stated to be of great importance to the profit of such sorts of dairying, that the cows should not calve too early in the spring season; as where that takes place they are liable to fall off in the quantity of milk that should be given in the autumn, when, on account of its superior goodness, it is more valuable than at any other time. It is consequently supposed, that from the end of March to the end of the following month, is the most suitable period, in the northern districts, at which a cow can calve, as she in a little time gets into good order on the early pastures, giving a much greater quantity of milk during the season, than those which calve either much earlier or later; while in the more southern parts it is often of great advantage for the cows to calve at much more early periods, as in the latter end of one year or very early in the following one.

NATURE AND CARE OF MILK, AND PROCESS OF CREAMING.

The proper care and management of the milk are matters which demand particular attention, and are of the utmost consequence to the success and profits in both of these kinds

of dairy business. A knowledge, therefore, of the nature of milk and the means of its creaming in the best manner will afford very material assistance. It is a proper and greatly beneficial practice always to pass the milk as soon as it is brought from the cows through a fine sieve or sort of strainer, formed by hair cloth, fine gauze, or very small silver wire, being tied on or fastened over a small opening in the bottoms of large wooden bowls made for the purpose, into the pans, skeels, or other vessels in which it is to stand for creaming or other uses. Though the most ready and beneficial modes of disposing the milk with a view to throw up the greatest quantity of cream in the shortest space of time, has not been quite decided, enough has been done to place the matter in a very clear point of view: for as it is evident that the oily, creamy, or buttery, particles are diffused and dispersed throughout the whole mass of the milk, and intermixed in its various parts between those of the serous or wheyey and the caseous or cheesey kinds, in such a manner as to be thrown up merely in consequence of its possessing a less degree of specific gravity than that portion or part which is commonly called milk, on account of its becoming in the state of rest, it can scarcely be doubted that the best and most suitable manner of placing or putting it by with the intention of creaming fully, and in the most expeditious and easy manner, will be that of very shallow pans, skeels, or other such vessels, so as that it may not stand at a greater depth than about three inches; as by such means there will be the least possible resistance given to the cream rising, and the greatest possible extent of milk surface afforded for its collecting and forming upon; by which a larger proportion of cream may not only be raised and provided from the same quantity of milk, but on account of the milk cooling in a more ready and equal manner, the disadvantage of any tendency to acidity in warm weather is greatly checked or guarded against by its being wholly prevented, as is proved by much experience in the best dairies. Whether any particular sort of material is better than another and more conducive to the rising of the cream in such cases, when used for the cooling vessels, is not well known; but there can be no doubt that wood and cool stony materials are far better and more safe than metals which can be acted upon by acids, as being not only more easily and conveniently kept clean and sweet, but from being less liable to be corroded and injured on their surfaces, which is hurtful in the business of creaming, care being taken that they be as smooth and even as possible. Long experience fully warrants these conclusions. Some suppose wood best in cool situations, earthen ware ones in those that are warmer, and metal for affording the most cream.

In regard to the nature of milk, and the proportion and means of the separation of cream from it, the correct results and conclusions given below are highly satisfactory and of great practical utility to the dairy manager relative to butter and cheese. It has been found, that of the milk which is drawn from any cow at one milking, that which first comes off is constantly and invariably thinner, and of a far worse quality, than that which comes afterwards, the richness gradually increasing to the very last drop that can be drawn away at such time. And though there are few who are engaged in dairy management who do not know that the milk which is last of all drawn from the cow in milking is richer and better than any other previously milked parts of it, yet very few are fully aware of the extremely great difference or disproportion there is be-

tween the quality of the first and last drawn milk from the same cow at the same milking. In order to the full confirmation of this, several small vessels, exactly alike in size and form, were taken and filled at regular distances of time during the milking, the last being supplied by the dregs or strippings; which were then each weighed so as to be certain that the quantity of milk in each was precisely the same. The result in all the cases, after numerous trials with many different cows, was, that the quantity of cream got from the first-drawn cupful in every case, was much smaller than that which was last drawn; and that those in the intervals between these two extremes afforded less or more, as they were nearer or more remote from the commencement or termination of the milking. The various intermediate proportions need not be noticed; but the quantity of cream gained from the last drawn cup of milk, in some cows, exceeded that got from the first in the proportion of sixteen to one. While, in other cows, and under particular circumstances, the difference or disproportion was not quite so great, yet in no case did it fall short of the proportion of eight to one. On the average of a great many cows, it would probably be found to run as about ten or twelve to one.

Further; the difference in the quality of the cream gained from the milk in the two cups was much greater than that in the quantity. In the first-drawn cupful, the cream was thin, filmy and tough, having great whiteness; while in the last-drawn, it was of a thick oily consistence, and of a glowing richness of colour, which no other sort of cream is ever found to have. And the difference in the quality of the milk, which was left after the cream was taken away, was probably still greater than either those of the quantity or quality of the cream. In the first-drawn cupful, it was thin and bluish, as if a very large portion of water had been mixed with milk in the common state; while in the last-drawn cupful it was of a thick consistence, and yellow colour, having more of the resemblance of cream than milk, both in the taste and appearance. It may consequently be concluded from these facts, that he who, by the bad milking of his cows, loses even only half a pint of the last milk, loses, in reality, about as much cream as would be thrown up by six or eight pints of that produced at the beginning of the milking; and especially of that part of it which alone can impart richness and high flavour to the butter, objects which are of material importance.

Again, if milk be set in a dish and suffered to stand until it throws up cream, that portion of it which rises first to the surface, is richer in quality and greater in quantity than that which rises in the next equal portion of time; and that which rises in this interval of time is greater in quantity and richer in quality than that which rises in a further equal space of time, and that of a still further than that after it, and so on in a constantly decreasing state in the quantity, and a declining one in the quality, so long as any cream rises to the surface. Though the difficulty and exactness necessary in such trials have not afforded the means of exactly ascertaining the difference in the proportion that takes place in the different equal portions of time, yet the matter has been so repeatedly proved, that there cannot be any doubt of it; and it must be allowed to be a circumstance of no small importance in the management of the dairy. It is by no means certain, however, that a greater quantity of cream may not, on the whole, be gained from the milk by taking it away at several different times; but the practice appears so troublesome

and inconvenient as not to be compensated by the increased quantity thus gained, if, in fact, any increased quantity be so produced, which has not yet been satisfactorily proved.

It is also ascertained that thick milk will always throw up a smaller proportion of the cream which it actually contains to the surface than milk which is thinner; but the cream, in such cases, is of a richer quality; and that, if water be added to that thick milk, it will afford a much greater quantity of cream than it would have done, if allowed to have remained pure; but its quality is at the same time thereby greatly debased. This is a matter which cannot but have been noticed by most of those who are attentive to dairy management; yet neither the exact amount of the increased quantity of cream that may be thus gained, or of the rate in the decrease of its quality has been ascertained; but the effects of mixing water with the milk in a dairy is fully shewn; and the knowledge of which may enable those who are attentive and correct in such business to pursue the practice which is the most suitable and proper for them.

It is also ascertained, that milk which is put into a pail, tub, or other suitable vessel, and carried in it to any distance, so as to be much agitated and disturbed, and partly cooled before it be put into the milk-pans or skeels to stand for cream, never throws up so much or so rich cream as if the same milk had been placed in the milk-pans immediately after it was milked. It is supposed, that the loss of cream, in such cases, will be nearly in proportion to the time that has elapsed, and the agitation and disturbance it has sustained after being drawn from the cow; but no sufficient proof has yet been given of how much it depends separately on the time elapsed or the agitation used.

It may, therefore, on these grounds, be concluded, that it is of much importance that the cows of a dairy should always be milked as near it as possible, in order to prevent the necessity of carrying and cooling the milk before it be placed in the pans or dishes; and that, as the cows are much injured by far driving, it is greatly beneficial in dairy-farms, to have the chief pasture-fields and lands as near the dairies or yards as convenient. That the too common practice of putting the milk of all the cows, in large dairies, into one vessel, as milked, to stand until the milking of the whole be finished, before any of it be put by in the pans for creaming, is greatly injudicious, not only on account of the loss sustained by the agitation and cooling of it, but also as preventing the dairy-man from distinguishing the good and bad cows' milk, so as to have them separated where necessary; as he may for a long time in this way have the whole of his dairy products much debased by the milk of even one bad cow, without being able to discover the reason of it.

If, therefore, it be intended to make butter of a very fine quality, it will be proper, in all such cases, to keep the milk which is first drawn separate from that which comes last; as it is evident, that, if this be not done, the quality of the butter will be greatly injured, without its quantity being much increased. It is likewise evident, that the quality of the butter will be improved in proportion to the smallness of the quantity of the last-drawn milk that is kept; so that those who wish to be very nice in this sort of management, should reserve only a very small proportion of the last-drawn milk. To those, however, who have only profit in view, it must, of course, be ever a matter of experience and calculation, how far it may be proper and expedient in them, to carry the improvement of the quality of their butter, at the

expense of lessening its quantity. Different practices in dairying will be found necessary and proper in different situations and circumstances, which are always to be well considered before they are undertaken. It is a consideration, too, of no small importance, to determine in what way the inferior sort of milk that is to be thus set apart, when fine butter is wanted, can be made use of to the greatest profit and advantage.

If the quality of the butter be the main intention, it will be necessary not only to separate the first from the last-drawn milk, but also to take nothing but the cream that is first separated from the best milk, as it is this first rising cream alone that is of the prime quality. The rest of the milk, which will be still sweet, may be either employed for the purpose of making sweet-milk cheese, or it may be set to stand for throwing up cream for making an inferior kind of butter, as circumstances may incline the dairy-man. On these grounds, it is easily perceived, that butter of the very best quality can only be gained from a dairy of much extent, under good management; as when only a very small portion of each cow's milk can be set apart for throwing up cream, and when only a very small proportion of that cream can be reserved as of the prime quality, it must follow, that unless the quantity of the milk was, on the whole, very considerable, the amount of prime cream afforded would mostly be too small to repay the expense and trouble of making. And on these principles, another conclusion, which is extremely different from the opinion commonly held on the subject, may be drawn, which is, that it is probable that the very best butter can only be made with economy in those dairies where the making of cheese is a primary object. The reasons for which are, that if only a small portion of the milk should be set apart for butter, all the rest may be made into cheese while it is yet warm from the cow and perfectly sweet; and further, if only that portion of cream which rises during the first three or four hours after milking is to be reserved for butter, the rich milk that is left after that cream is separated, being still perfectly sweet, may be converted into cheese with nearly as great an advantage as the newly-milked milk itself. But as the purchasers of such finely-formed butter could not probably be many, at the price which would be necessary to satisfy the dairy-man for the trouble and attention in making it, these directions are given merely to show the curious in what way butter possessing so superior a degree of excellence may be provided, if they be willing to be at the expense; but, for the common markets, if, in general, about the first-drawn half of the milk be separated at each milking, and the rest only be set up for producing cream, and then if that milk be suffered to stand to throw up the whole of its cream, even until it begins sensibly to have a sourish taste, and if afterwards that cream be well and carefully managed, the butter so produced will be of a quality greatly superior to to that which can be usually procured at market, and its quantity not much less than if the whole of the milk had been managed in a similar manner. This is, therefore, the practice which is thought the most likely to answer the purpose of the economical dairy-man, as his butter, though of superior quality, is capable of being afforded at a price which will always ensure it a ready sale.

In the above view of the separation of the cream from the milk, there is another matter which it is very useful and important to know; namely, the degree or state of heat at which the several changes are capable of taking

place with the most certain benefit and success at the different seasons of the year; as it has been now satisfactorily proved, that when the heat of the atmosphere rises higher than sixty degrees on Fahrenheit's thermometrical scale, the process of separation becomes difficult and dangerous; and that when it falls short of the fortieth degree of the same scale, it can hardly be carried forward, if at all, with any sort of propriety or economy; it may be fairly concluded, therefore, that when it is from forty-eight or fifty to fifty-five or a little higher, the separation of cream from milk, which is one of the most interesting and important operations of the dairy, goes on with the greatest regularity, and in the most favourable and beneficial manner. This range is consequently that which contains the degrees of heat which should be aimed at, though the precise or exact points in it cannot be well determined, on account of the influence of a variety of causes. In order to keep at all times within the above range, a scale of this sort should constantly be kept hung up in the milk-room of the dairy, to give notice of any material change in the state of the heat of the surrounding air, which may operate injuriously in such business.

It is a practice in some butter districts, to make two sorts of this article from the same milk, which is effected by taking off the cream when it has stood for ten or twelve hours, which makes a butter of very fine flavour: after which the milk stands as long as any cream will come upon it, of which a very insipid butter is made, that will not keep or be eatable for more than a day; and, therefore, there seems to be no advantages gained by such methods. In some places, also, it is a custom to work and manage the whole of the milk and cream together for butter; and with this intention the milk stands as long as it continues thin on the surface, and then is made into butter, in which way a very good tasted butter is formed; but this practice cannot be had recourse to where skim-milk cheeses are made. More butter is supposed to be formed from the same quantity of milk in this manner than from the cream used alone, in the proportion of about five to three.

Some persons consider that the cream rises more quickly, and that any bad taste is more certainly prevented or corrected, by having one part of boiling water put to three of milk, when it is placed in the leads.

Much advantage is supposed to arise from hastening the cooling of the milk, by placing it in leaden or other cool pans or vessels, thus retarding or wholly preventing its taking on the fermentative process in the warm summer season, and thereby preserving it from a state of acidity; but which in winter is evidently altogether unnecessary. The quality of the cheese might probably, in this way, be improved, and the difficulty of making it lessened, by more quickly and fully cooling down the milk, by the operation of often taking it away from the coolers and pans, and returning it again to them, or to fresh ones, almost immediately.

On the quality of the milk, and the correctness of the management, in this process, the goodness of the cheese, for the most part, depends; but there is a difference in the quantity of the cream or richness of the milk, which is made use of on different occasions, or as they are made *one* or *two-meal* cheeses.

In some districts, where large excellent cheeses are made, the practice of the best dairies is, to take about a pint and a half of cream, when two-meal cheeses are to be made, from the over night's milk of about twenty cows. When cheese of the best quality and in the largest quantity is to be made, it is generally

admitted, that the cream should remain in the milk; therefore, whether cream that has been once separated from it, can in any way be again so intimately incorporated with it, as not to undergo decomposition in the process afterwards, is a matter of some doubt; so that there can be nothing improper in endeavouring to prevent the separation of the two substances which it is the intention again to unite. If, however, a cheese made wholly of the over night's milk, on which the cream has risen, be as rich or good in quality as one made from new milk, other circumstances being the same, it is some proof that milk and cream, after being disunited, may, by heat alone, again become as it were new milk. However this may be, the practice here is, to unite the milk and cream, and those long engaged in the business contend, that when they are so united, the milk differs in no respect from that which is new, as far as cheese-making is concerned.

In making one-meal cheeses, the whole of the milking is directly made use of in its simple state, as it comes from the cows; but for two-meal sort, the two milkings of night and morning are mixed together; the quality of the milk used in the two kinds is materially different; in some cases all the cream of the first meal is taken away, and in every one some part of it. In some places the milk of the first meal is set in the pans or leads in the common way, and as this is the evening's milk, which is mostly put to the next morning's, the business of the cheese-making begins directly after that milking is over, that is, from five to six o'clock. After taking off the cream from the over night's milk, that of both the meals is taken and put into the cheese-tub, only reserving in some cases a half, in others a third, to be thus applied. After it has been made scalding hot in a brass pan over the fire, or by being put into a close vessel in hot water, one half of it is poured into the cheese-tub among the cold milk, and the other half put into the pan in which the cream has been placed; when after the cream and the hot milk have been well blended together, the whole is poured into the cheese-tub, the contents of which, by this time, have been increased by a large portion, if not the whole, of the morning's milking warm from the cows. In this manner, the different meals of milk are made to form, as it were, a fluid of the same kind, which is equal in quality and in the state of heat, and to which the steep is to be applied in the usual way. This re-union, or *melting the cream*, as it is termed, though usually practised, is probably not so efficient in forming cheese of the best quality as that of using milk which is wholly in its new state.

In making skim-milk cheeses, the milk is set as usual in the pans or coolers, in which situation it continues a longer or shorter time, as the state of the weather may be in respect to heat, the cream being carefully skimmed or drained off in proper time, before it acquires or becomes in the state of acidity. If, however, such a state should occur, from the warmth of the season, inattention in the management, or any other causes, in that case, instead of giving the skim-milk the necessary degree of heat after the steep is applied, by putting it over the fire or furnace of the dairy, as is the usual practice, the improved method is, to put it immediately into the cheese-tub, and to pour in such a quantity of hot water as will give the desired degree of heat, so as to prevent the mischief; as by this means the hazard of the milk being broken, while heating over the fire or furnace, which, when not in a perfectly sweet state, it is very liable to do, is guarded against, without any inconvenience being sustained in other ways.

Milk of this sort requires more steep than is commonly used to the same amount of milk, which contains the whole or a large portion of its cream. The main point in these cases is, to let the milk be curdled or coagulated in as sweet a state as possible.

TIME OF MILK STANDING IN THE PANS FOR CREAMING.

The particular length of time which milk should remain standing in the pans or skeels, for throwing up the cream in the most ready and abundant manner, must vary according to the season of the year and other circumstances; but if the very best sort of butter be the object, it should not be long. Some imagine, that it must constantly be regulated by the particular views and intentions of the dairy-man, and the state of heat of the surrounding atmosphere. Where there is a medium state of warmth in the air of the dairy, and good, or rather fine, butter is to be made, it should not be permitted to stand longer than from six to eight hours. With the intention of making good common butter, it may safely be let stand twelve or more hours. But in very large dairies, where there is a sufficient quantity of cream, and in which the very best butter is to be made, the milk being afterwards while sweet, to be converted to some other purpose, it should be suffered to stand, before the cream be separated from it, from two, to three or four hours. Some correct dairy-women think, that it is useful to put a little hot water to milk in winter, immediately after it comes from the cow, as it has the effect of making it yield the cream better. It is also thought essentially necessary, that the pans or skeels in which the milk is to be set for creaming, should be scalded, or warmed with hot water, or put before the fire, at the same season, previously to the milk being placed in them. In many cases the milk is suffered to stand a much greater length of time than the above, even as many as twenty-four hours and more, and still it produces good butter.

SKIMMING, OR CREAMING, THE MILK.

In general, the practice is, to skim or cream the milk not more than once, but in some particular districts, it is the custom to skim it several times, as two, three, or four, or until no more cream rises on its surface. In this business there are two modes pursued; but that which is the most usually practised is, to skim it off lightly and nicely, by means of a thin light skimming-dish, made either of finely-formed and edged tin, sometimes with holes in the bottom, or some hard sort of wood. It is a method which requires much nicety and dexterity in the use of the hand, which is only to be acquired by considerable practice; but the perfect execution of which is a matter of very great utility and profit to the dairy; as, should any part of the cream be left behind, the quantity of the butter will be lessened; and if any part of the milk be taken along with the cream, its quality will be debased and deteriorated, and the butter, of course, rendered of inferior value. The other mode is only put in practice where large leaden cisterns or stony vessels are commonly used for the milk to stand in; and where it is chiefly employed in making skim-milk or two-meal cheeses, and consequently before an acidity or coajulation has taken place.

In such cases, towards the centres of the vessels, holes are made, which, before the milk is put into them, are closed up by means of proper stoppers, which rise several inches above the surface of the milk contained in them. Whenever the milk is wanted, proper vessels are placed under the holes, and the stoppers drawn up so far as to suffer the milk to run off, but in so gentle a manner, that the surface of the cream is not

ruffled or broken; by which means, the milk being thus gradually drained off, the cream sinks down until it at last settles on the bottoms of the pans or cisterns, when the vessels into which the milk has been drawn are removed, and others placed for the purpose of receiving the cream, the plugs or stoppers being wholly pulled out, when the cream drops into the vessels which are to contain it.

The cream from the first skimmings is often only put into the tubs or cisterns for first or fine butter, while that afterwards collected, is put away for second or *after butter*. The number of the skimmings must in some measure be regulated by the depth of the milk in the leads or vessels.

KEEPING THE CREAM.

As soon as the cream has been separated from the milk by one of the above methods, it should be directly put into a proper vessel by itself, in order to be kept until a suitable quantity be collected for the purpose of being made into butter; and no sort of vessel can possibly be better fitted for this use, than a firm neat well-made wooden barrel, suited in size to the extent of the dairy, which is open at one end, with a lid or cover exactly fitted in to close it. In the front of this vessel, close to the under part or bottom, a cock should be placed for drawing off occasionally, as it may be necessary, any thin serous part of the milk, which may happen to be formed and deposited; as, should this be suffered to continue there, it would soon act upon the cream in a very powerful manner, and greatly detract from the rich quality of the butter. The inside of the cock-hôle or opening in the front of the barrel should be laid or covered over with a small portion of close fine silver wire, or silver-gauze netting, with the view of keeping the cream back, while the serum is admitted to pass; and the stand with the barrel upon it, should be contrived so as to incline a little forward in the top part, in order to allow the whole to run and drain off below. A well-glazed pot, or large sort of jar, is often used for this purpose with propriety.

The nature of the management in regard to the cream is so very different in different districts, and places, that it is impossible to state any exact period or length of time for its being kept before the making of it into butter. In some districts, which have been long celebrated for the very superior excellence of their butter, the cream is rarely kept longer than three or four days at most; but always until there has a certain degree of acidity taken place in the cream, either naturally or by some artificial means, as without that a good production of butter cannot be ensured: some are in the habit of keeping a little old cream for this use, others employ a little cheese steep, and some squeeze a little lemon-juice into the cream. It has been noticed, also, as the practice in large dairies, greatly extolled for making butter of a very superior quality, that when this product was to be sent immediately to the market, it was the custom to make the cream into butter the second or third day of its standing; but when to be salted, to keep it standing a day or two longer, or until it had acquired a certain state of acidity. It was there supposed, on the grounds of very long and extensive experience, that the butter which was made from fresh cream was much more agreeable to the taste, and pleasanter for immediate use; but that it would not take in the salt so well, or keep so long as that which was made from cream that had been kept longer standing.

There can scarcely be a greater mistake in the whole art of dairying, than that no butter can be of the best or finest quality, but that which is made from cream that has not been kept standing longer than one day. This, in-

deed, is an opinion so far from being founded in truth, that it is in very few cases that even moderately good butter can be prepared from cream that is not more than one day old. As it is fully proved, that the separation of the butter portion of the cream takes place in consequence of a certain degree of acidity having been communicated to it; if it be agitated with the design of producing butter, before it is in that state, no butter whatever can be produced, but the agitation must be continued till such a state of acidity does occur; after which, the butter begins to form itself. In a warm state of the atmosphere, during the summer season, the heating and agitating of the cream may easily be continued until the proper state of sourness be induced, and butter be produced; though, in all such cases, the process is long, tedious, and troublesome, and the butter mostly soft, loose, and of a tough gluey feel. In case the same management be had recourse to in the winter season, butter can then be scarcely in any way procured, unless by the addition of some degree of heat in some manner or other, which occasionally may produce a very inferior sort of butter, which is very white, hard, and brittle in its nature, having very little taste, and which is scarcely fit for any use whatever. Such a practice should not therefore be attempted by the intelligent dairy-man, but the cream should be suffered to continue in its proper keeping vessel until it has taken on the necessary state of acidity, that renders it suitable for being made into butter, without any very great degree of heating and agitating; as it is in such a way only, that very fine butter can be produced in dairies of this sort.

The exact length of time that cream may be kept, before it takes on that state of acidity which is requisite for forming the very best butter, and after that has happened, the period that may elapse before its quality becomes sensibly injured, or wholly destroyed, will most probably vary with the state of the seasons, weather, and many other circumstances. It has, indeed, been noticed, that so very little nicety has been thought necessary in this particular, by practical dairy-men, that even among those who stand high in character for making good butter, few ever think of attending to any precise rules or regulations of this sort, in regard to the several portions of their cream; as they, in general, make all the cream they have collected since the last churning into butter, so that the new and the old creams are all beaten up and agitated together; there being no determinate rule as to the length of time that should take place between one making of butter and another, or the time of standing for the cream, it being usually determined by local or accidental circumstances and causes. There is, however, reason to suppose, that if cream be well and carefully kept, and no serous or other sort of injurious matters be suffered to stagnate and lodge in any way about it, a very considerable latitude in this particular may be safely allowed; and though no exactly fixed times can therefore be with propriety and utility put down, as it is well and certainly known, that cream which has been kept standing three or four days in summer, is in an excellent state and condition for being made into butter, and that in winter it may be kept standing with great advantage for several days longer; it may be concluded, that from three days to seven, and ten, may in common be the most proper lengths of time for keeping cream standing before it is used for butter; yet, should particular circumstances or convenience render it necessary, still longer time may be taken without any great injury being sustained. If, for instance, the dairy-man should happen

to have such a quantity of cream, as that it may be worth his while to make butter once every day, there is no reason whatever why he should not do it. It is only necessary in such a case to provide a separate keeping vessel for the cream for that day, or for such time as it is intended it should stand, before it is to be prepared and formed into butter; if one day, one such vessel; if three days, three such vessels; and if four days, four such vessels; and so on, for any number of days it may be designed to keep it; so that cream of any certain day's age may conveniently be formed into butter. On the same principle, if it were ascertained that a fully sufficient quantity of cream was gathered together for the purpose, in two, three, or any greater number of days, it would be easily contrived and arranged so as to be enabled to make butter every day; and by which means, the operations and business of the dairy might be rendered perfectly easy, regular, and profitable. Some think the nature of pastures, as producing good or ill-flavoured butter, should regulate the time of keeping the cream, as in the latter it cannot be too short.

In some large dairy districts, it is often a practice to make the whole of the milk, without the cream being at all taken from it, undergo the process of butter making. As soon as the milking is over, the whole of the milk with its cream in it, is cooled, as the state of the heat in the summer weather may be, in separate vessels for this use, by which it takes on the proper state of sourness; and by warmth, by being set by the fire in the winter, the certain necessary degree of acidity is brought on. By which means, a greater quantity of butter is produced, but it is of an inferior quality. However, where proper care is taken, and especially if a portion of the first drawn milk be set away for other uses, very good butter may, in many cases, be gained; though the practice is on no account whatever to be advised, as it has nothing sufficiently desirable or beneficial in it to be an object of the dairy-man's.

Some stir the cream by a stick which has that name, once or twice a day, but which is, probably, not very material.

COLOURING BUTTER AND CHEESE.

While the cows are feeding in the pastures, in the summer months, there is nothing necessary to be done in the way of giving colour to butter, in the view of rendering it more saleable or desirable in families; but in the autumn, winter, and more early spring months, it is sometimes found necessary, in the dairy management of many places, to change the very pale and tallowy appearance of the butter, which is then produced, for that of a more yellow and inviting cast, though the former may be natural to it at such seasons of the year. This purpose is effected in butter as well as cheese, by means of a slight infusion or diffusion of a fine colouring substance which is called *arnetta* in the shops; which some prepare for the purpose, by finely rubbing and levigating a little of it on a stone or marble slab, with a little water, and then mixing it with a small quantity of the cream at first, and afterwards incorporating it with the whole, before it is put into the churn for the purpose of being converted into butter. The quantities usually employed are mostly very small, and should be judged of by the effect which is produced, as the difference in the colouring quality of different portions of the substance is very materially different.

In cheese-making, as the practice of colouring has been so long in use in many of this kind of dairying districts, it is almost certain, that such cheeses as are without it, though of the very best quality, would be nearly unsaleable. The

nature of the colour is mostly to be regulated by the title and distinction under which the article is to be disposed of; and there can scarcely be any doubt, but that the practice had its rise in the design of giving the appearance of richness in quality, though the poorest and leanest cheese constantly stands in need of the most colouring matter, to bring it to its proper appearance. In respect to the quantity of the colouring matter necessary, in some districts and places, the weight of about a drachm and a half, or two drachms, is supposed sufficient for sixty pounds' weight of cheese; while in others, an ounce is usually allowed to the hundred weight. A piece of the size of a common nut is mostly sufficient for a cheese of twenty pounds' weight. It is used and applied generally in one of these ways: when the colour is wanted in some cases, in the morning, it is tied up in proper quantity in a linen rag, and put the night before into about half a pint of warm water. Directly before the steep is used, this infusion is poured into the milk; and after being well stirred about, and mixed with that fluid, so as to be perfectly incorporated with it, the steep is put in, and the whole left to stand closely covered up. In other places, it is the mode to rub a portion of the unpounded material on a smooth flat stone, after being dipped in the milk, in much the same manner that paint is rubbed down. After which, the colouring thus produced, is carefully blended with the milk in the cheese tub, in the mode, and at the times already noticed, care being taken that not any of the unreduced particles are suffered to fall in and be mixed with the milk.

As to the vegetable colouring matters, such as those of the marigold, carrot, and some others, for producing a yellow cast; and those of the sage, the nettle, and others for giving the green tinge to cheese, they are far less certain, and more troublesome than the above substance in their preparation and use, without any particular advantage.

AGITATING, OR CHURNING THE CREAM, &c.

While the oily, or butter portion of the milk rests in the state of cream, the several constituent particles of it are not in a sufficiently close or united condition to produce the uniform substance termed butter, in consequence of the large quantity of interposing serous fluid; in order therefore to effect this point, it becomes necessary to force that matter out by means of long-continued working, and agitating it in the preparatory process of butter-making. After the separation and preparation of the cream or milk in the manner that has been stated, it is therefore to be put into agitating vessels of such kinds as may be thought most preferable, there being many different sorts made use of in different situations, and these well and regularly worked for some time, in order to separate the butter part from the others.

The great care which the most correct dairymen bestow in cooling the beating vessels in summer, by filling them with cold water for some time before they are used, and in winter, by warming them with scalding water, proves their conviction of the great importance of keeping the cream in an equal degree of temperature as to heat, during the beating process, in order to produce good butter. It follows, therefore, that as some beating vessels are better adapted to acquire this end than others, such ought to be preferred as most freely admit the fullest supplies of fresh air, and most completely and readily expel the foul and overheated air which the violent agitation necessarily engenders.

For this, as well as some other, reasons, the

old upright agitating contrivance, especially as improved and rendered so much more easily wrought by Mr. ———, an ingenious gun-smith, at Ormskirk, in Lancashire, is by many considered superior to any other.

It has, indeed, been concluded, from some late trials made between those of the upright and barrel forms, that the former produce more butter, and of superior quality, as well as afford it more readily, from the same amount of cream, in the same time, whether worked by hand, water, horse, or any other such power. Some of these effects may probably arise from the cream never remaining at rest, which is always the case in this sort of churning vessels, and especially in those improved as above mentioned, in which the dashers move round upon the heads of the staffs; while, in some of the latter kind they are wholly fixed. It is the constant equable action on the cream and motion of it that has the effect of producing the butter in the best manner. It would, probably, somewhat improve the action and effects of such churning vessels if they were made rather wider in their bottom parts. These kinds of vessels have likewise another great advantage, which is that of being cleaned with greater ease than any other sort.

In the whole of this agitating and beating process in making butter, much more nicety and correctness is necessary than many suppose, as it is well known to almost every dairy-woman in the country, that a few intemperate, hasty, and irregular strokes will not unfrequently render the whole of the butter of little or no value; which, but for such carelessness, might have been of the best quality and the finest kind. Great care is, therefore, necessary to have proper steady persons for the execution and management of this part of the business of the dairy in all cases.

In summer this sort of work is commonly the most conveniently done either early in the morning or towards evening, when the cream or milk should be put into the churning vessels by passing it through a strong piece of rather open linen cloth, and then should be covered up and set in some cool part of the dairy, or other place; and, in the winter season, when severe, the cream or milk should be put towards the fire for some time before placing it in the vessels, so as to become regularly warmed, and kept in the same situation when in them; but too much heat is always to be avoided. The time of the butter coming will be different under different circumstances, but is usually about an hour and a half in the whole process. When, after dull heavy strokes, they become light, sharp, and easy, it is a sign that the butter is coming or come; when it is to be collected or gathered into a mass, which finishes the work until it be made. In summer the strokes should be more easy and gentle than in the winter-time, as otherwise the butter will be liable to be soft, light, and oily; but in other respects there is no difference.

PROPER SEASON FOR CHEESE-MAKING.

There can be no doubt but that the best time for this purpose is that while the cows are at full feed on the pasture grasses, as from the beginning of the last spring month until about the end of the first autumnal one. But where the cows are kept well and fully fed in the manner already noticed, there can be no difficulty in making good cheese at any time of the year. In the best large dairies of several cheese districts, it is not unfrequently the practice to make cheese throughout the whole year; though some think that, that which is made during the winter months is much inferior in quality, and much longer in becoming ripe or in a fit state for the market or for eating,

than that which is made any time within the season just stated. In the principal district where the thinner sorts of cheeses are made, the *thin* kinds of this article are usually prepared from about the beginning of the spring season to the end of the autumn; while the season for making the *thick* sort is during the last of the spring months and until a little beyond the middle of the summer season; as when they are made later in that season, they are not found to get sufficiently firm and solid to become fit for the market in the ensuing spring season, which would, consequently, be productive of much loss.

FORMING AND PREPARING CHEESE-STEEP OR RENNET.

It is very material that this should be well and exactly prepared in so far as its strength is concerned, as it is upon this that much of the good or ill quality of the cheese depends. Most sorts of acids will answer the purpose of curdling milk, but the substance which is probably the most proper and suitable is that of the maw or stomach of the young sucking calf, after being in some manner prepared with salt-pickle. In common this substance is used after it has been simply cut open, the internal curdly matter removed, washed perfectly sweet and clean, well salted, and spread out to dry by being hung up and distended in all directions as much as possible by small pieces of sticks. It should be kept hanging in a perfectly dry place for some time before it is used, as the older and drier it is, the better it answers in cheese-making. A piece of the proper size, as from an inch to an inch and a half in the square, in proportion to the size of the cheese, is to be cut off and put into half a pint of pure water in a proper vessel, the night before the cheese is to be made, with about an ounce of salt, as a steep, then as soon as the milk is ready, the liquid is applied, mixing the whole well together by stirring.

A better mode of preparing this article is, perhaps, the following; (for it should be remembered that it is the combined and concentrated fluid of the stomach, which produces the effect on the milk, just as it does on the food.) Let the calf bag be laid quite open and the curdled contents taken carefully out and placed in a clean vessel; then let them be well picked and cleaned by frequent washing from all sorts of dirt and filth till quite pure and white, when they should be laid upon a cloth to let the water drain well away, and in that state let them be rubbed plentifully over with salt; after which, the bag itself is to be well cleaned by repeated washings, and well salted equally on the in and out side, when the curdly materials are to be replaced in it, and the whole deposited in a suitable earthen-ware jar, and well fastened down by a portion of wetted bladder, in order to prevent the entrance of the external air. It is best not to use this preparation when too newly made, as it is apt in that state to cause a hoviness and hollowness in the cheese. It is sometimes used by being triturated or rubbed down into a fine state, and mixed with a little portion of milk; and some persons mix aromatic spices and other substances, which are wholly useless, with it, before it is made use of as a steep in the above manner. From half an ounce to an ounce of such prepared curd is sufficient for ten or twelve gallons of milk.

But as all such preparations, on account of the number and variety of manipulations made use of in the forming of them, are liable to vary greatly in their strength, it is, probably, the best and most correct way for rendering them always equally strong and regular in their effects, to force and extract the whole of the useful parts from them at once; a practice which

is in use in some large dairy districts. With this intention, therefore, the whole of the maws or stomachs, which are to be used at one time, are to be put into a proper open vessel, and from two to three pints of spring water for each, as the size may be, poured upon them. In this state they are to continue for a whole day and night. They are then to be taken out of the water and put into another vessel, with not more than half the above quantity of the same fluid, and are to remain the same length of time, repeating the same as necessary; when, at last, the whole are to be taken out and thrown away as of no farther use; and the first and second or more infusions or steepings well mixed together, and put through a fine sieve or strainer into an earthen jar, to which salt is to be added in large quantity. The steep or liquid thus prepared is then fit for use, and requires nothing further to be done to it, except occasionally taking off any scum that may arise on the surface of it, and supplying a little more salt as that at first used may become dissolved and lost. The quantity which is mostly sufficient for curdling as much milk as will make about sixty pounds' weight of cheese, is that of nearly half a pint. As any part of it is taken away, the rest should constantly be well stirred up.

FORMING AND SETTING THE CURD.

The exact state of heat which milk that is to be made into cheese should possess, before the steep is put to it, is not certainly fixed; but it is well known that both the quantity and quality, as well as the texture of the curd, depend very greatly on the length of time it is in coming or being formed, on that of the amount and strength of the steep made use of, the state of the surrounding air, and the warmth of the milk at the time of the steep being put to it. It is well known, too, from daily experience that the warmer the milk is, when the steep is put to it, the sooner it will curdle or coagulate with a certain quantity of steep of the same strength; and it is equally well known that the cooler the milk is, and the longer it is in curdling or congealing, the more tender and delicate the curd becomes; while, on the other hand, if the milk be too hot, and the coagulation or curdling takes place in too rapid a manner, the curd turns out to be tough and harsh. It is also proved that a cheese made from milk that has been coolly and slowly coagulated, is a greater length of time before it becomes in a marketable state than one made from milk that has undergone a less slow coagulation; and which, from being drier and more harsh in its texture, sooner becomes in the cheesy state and fit for the taster. Consequently, the great difficulty in this stage of the business consists in obtaining the proper degree of warmth of the milk when *set;* or when the steep is put to it; or in the degree of heat retained by the curd when it *comes*, or when the coagulation has fully taken place; or in the length of time between the *setting* and *coming*, which length of time may be regulated either by the degree of warmth of the milk when *set*, the state of warmth in which it is kept in the time of coagulation, or by the strength and quantity jointly of the steep.

In proof of these points, the trials given below were made in the month of June; when, in the beginning of it, twenty-three gallons of milk, heated to ninety-six degrees, on the scale already noticed, with two tea-cupfuls of weakish steep, came in one hour; the curd delicate and good. On the next day, the same quantity of milk, of the same heat, with one tea-cupful of steep, came in nearly the same time; the curd somewhat tough, occasioned,

as is supposed, by the milk burning to the kettle in which it was heated. The following day, twenty-seven gallons of milk, heated to ninety-four degrees, with the same quantity of steep, came in about two hours; the curd very good. On the next following day, twenty-six gallons of milk, heated to one hundred and two degrees, with one tea-cupful of steep, came in two hours and a half; the curd very good. The day after which, twenty-five gallons of milk, heated to one hundred degrees, with a tea-cupful and a half of steep, came in about one hour and a half; the curd good, but somewhat tough, caused by the milk being kept too warm in the vessel, by being covered up too thickly and closely. It is noticed, that in the second and third trials, the whey retained a heat of about eighty-eight degrees; while in this last it was ninety-two degrees: so that it is, perhaps, not the heat when it is set, but that when it comes, which gives the quality of the curd. Then twenty-five gallons, at ninety-six degrees, with two cupfuls, uncovered, came in two hours and a quarter; whey eighty-seven degrees; curd very tender. After that, twenty-three gallons, at one hundred degrees, with more than a tea-cupful, uncovered, did not come in two hours; owing to the steep being lower in strength than in the former case; consequently, a little more being supplied, brought it in about three hours' time from the first setting; the whey at eighty-four degrees; the curd uncommonly tender. Afterwards, twenty-four gallons of milk, at one hundred degrees, with two cupfuls of steep, uncovered, came in two hours; the whey at eighty-nine degrees; curd extremely tender. Then twenty-eight gallons of milk, at ninety-two degrees, with three tea-cupfuls, or strongly steeped and covered up with coarse linen cloth, came in one hour and a half; the whey eighty-six degrees; curd very good, and of a fine colour, but which would probably have handled more tender, if it had not stood some time after coming, before it was broken up. It is probable, that much may depend on its being broken up just at the proper moment. Towards the middle of the month, twenty-eight gallons, at one hundred degrees, with two cupfuls, uncovered, came in one hour and a quarter; the whey ninety-four degrees; curd somewhat harsh, but of a good colour. Of course, the change of colour is to be attributed to the change of pasture. It is proper, too, to cover the milk, in order to make it come together. In the above case, it came and grew hard at the bottom, half an hour before it was set at the top. In exactly the middle of the month, twenty-eight gallons, the milk heated to ninety-two degrees, with two cupfuls of steep, and covered after it had stood three quarters of an hour, came in one hour and a half; the whey eighty-nine degrees; the air being warm; curd very good and tender. The day after the above, thirty gallons of milk, heated to one hundred and three degrees, but lowered to ninety-six degrees, by two pails full of cold water, with two cups and a half full of steep, and kept closely covered, came in one hour; the whey ninety-four degrees; curd pretty good, but not sufficiently tender. The succeeding day, twenty-eight gallons, at ninety-seven degrees, with two and a half cupfuls, covered, but not closely, came in one hour and a half; the whey not tried; curd somewhat tough, which toughness was attributed to some milk of a new-calved cow being mixed with it. In order to try the exact degree of milk directly from the cow, a dish was immerged in the pail while milking; which, after it had been in long enough to receive the state of the heat of the milk in it, on emptying it, and instantly milking into it from the teat of the cow,

then about half milked, the heat given was ninety-five degrees: the cheese, in the first of the immediately above two trials, likewise, pressed remarkably elastic and spongy; probably owing to the milk coming too hot, or to two or three of the cows being a bulling, or being made thicker than usual, or to the press not being heavy enough for them: but such ill quality may arise from the cold water put into the milk. The milk of cows in the bulling state is found to have ninety-eight degrees of heat after standing for some time in the pail after milking; which shows that the state, if not the quality, of the milk is changed by the heat of the cow, and careful dairy-managers will constantly endeavour to keep such milk out of the cheese-tub.

Towards the end of the month, thirty gallons, at ninety-five degrees, covered, came in one hour and a half; the whey ninety-two degrees; curd pretty good. Then thirty gallons, at ninety-two degrees, with two cupfuls of steep, covered; curd very good. After that thirty gallons, at ninety-eight degrees, lowered by half a pail of cold water to ninety-five degrees; curd good, but the cheese pressed like those before, hollow, spongy, and soft. It is, therefore, probable, from such cases, that lowering the heat of milk with cold water has a bad effect. Fifteen gallons of the evening milk, warm from the cow, retaining a heat of ninety-two degrees, with two cupfuls and a half of new weak steep, and closely covered, came in three quarters of an hour; the whey eighty-eight degrees; curd very delicate and good. And forty gallons of half-skimmed milk, heated to eighty-seven degrees, with three cupfuls of steep, slightly covered, came in three quarters of an hour; the whey seventy-nine degrees; the curd remarkably good of the sort. It has been found, that a common teacupful of very strong steep is capable of perfectly coagulating upwards of forty gallons of milk, when heated to only eighty-eight degrees, in thirty-five minutes. It is, consequently, evident, that in cheese-making, curd of a good quality may be gained from milk heated from eighty-seven to one hundred and three degrees of the scale noticed before, provided that the steep be so proportioned, that the time of coagulation or curdling be from three quarters of an hour to two hours and a half; and that the milk be kept properly covered during the whole of that process. On the whole, it seems, that the range from eighty to ninety is that which contains the proper degrees of heat for managing this business; that from one to two hours is the proper length of time for the coagulation to take place in; and that the milk should be so covered up as to lose in the operation about five degrees of its first heat; the influence of many different causes, as those of season, weather, and pasture, may, however, tend occasionally to vary these points. In general, the hotter the milk and steep are put together, the sounder the cheese; and the colder, and the richer, the more liable it is to decay. It is supposed better to use hot water in warming the milk than heating the milk itself, as the fire is apt to injure the flavour of the cheese.

In these particulars, the practice of different dairies in different districts, and even in the same districts, is often materially different. In some, that which is used is, that the lowest degree of heat which milk for this purpose should have, when the steep is applied, is one half of that of milk newly drawn from the cow; and the highest, that of about double the warmth. On this principle, it is supposed, that by the time the milking of a large dairy of cows can be completed, and the milk properly disposed

for being coagulated by the steep, the dairy-manager will not greatly err in using it as soon as possible afterwards. As this rule is, however, liable to uncertainty, from the influence of the variable states of the seasons, the weather, and many other causes, the heat of the milk before the steep is used is in all dairies distinguished for the excellence of their cheese, raised or lowered by the addition of warm milk or cold water, to that state which experience has shown to be the most eligible and proper. The milk produced on poor clayey pasture lands has been found to stand in need of more heat being used, than that which comes from cows on the richer sorts of pastures, as, where this is much heated, the business is rendered more difficult and troublesome. The more constant use of the lactometer and the scale already noticed than is commonly practised in dairies, would be of great advantage in deciding and fixing these as well as many other points of great importance in dairy management; for when the process of coagulation is too much hastened, or restrained beyond the time necessary for its being properly executed, which for cheeses of about half a hundred weight is usually an hour and a half, by either putting in too much or too little steep, or by using it when the milk is in too hot or too cold a state, the quantity of the curd is not only lessened, but the quality, in either case, greatly injured; in the one becoming of a tough gluey nature, and in the other too delicate and tender in its properties. As soon as the steep has been put in, the vessel containing that and the milk should be covered by a sort of wooden lid, over which a linen cloth should be thrown; when, after standing the usual time, the manager, on finding the curdling complete, may proceed to the necessary separation of the parts, and perform the further work which is necessary.

GATHERING AND REDUCING THE CURD.

However simple and easy these practices may seem, there are few matters in the work of cheese-making in which there is so great a diversity as in the latter of them. In some cheese districts they commence by breaking and cutting the curd with the hand and cheese-knife in various ways, so as to cause the whey to be readily separated without any loss of the richness of it; after which, time is given for the reduced curd to settle in the tub; when the knife is again used more freely than before, and the unbroken curd resting at the bottom being stirred up by the hand and fleeting-dish, the large pieces are further cut and reduced. The curd being thus fully broken, time is again allowed for its settling once more; and the whey is then forced off from it by means of the dish. In other districts, equally in repute for good cheese, the dish alone is used in reducing the curd, and in order to expedite the separation of the whey from it, some of that which first rises is taken off, and on being heated or cooled, as the state of the weather or the desired consistence of the curd may be, is returned into the cheese tub, and after continuing there a short time, the whole is taken away in the usual method. The whole of the whey that can be drained off without too much pressure, being thus removed, by inclining the cheese-tub on one side; the curd is thus brought into one mass or lump, and at first pressed well with the back of the dish that is used. When no more whey can be forced off by this method, other more forcing means are had recourse to: the curd being in many cases cut still more with the cheese-knife, to let away the whey.

and then squeezed as hard as possible by the hands, or, in some instances, by heavy weights applied for the same purpose. The curd is then suitably reduced for being put into the cheese-vat.

In some particular extensive cheese districts, the curd, when properly broken and reduced, is again restored to the cheese-tub and scalded, by pouring over it a pail-ful of hot water, or hot whey and water mixed, which, after such application, is well stirred together; and, after standing some time for the curd to settle to the bottom of the vessel, the scalding fluids are poured or skimmed off, and the curd pressed as before, until no more whey can be forced out, and it is then ready for being put into the vat in the usual manner.

Some have supposed that the curd produced by different sorts of pastures, stands in need of different kinds of scalding liquids. The quantity in which they are used is usually in proportion to that of the curd, so as to float it well, and render the mixture easy to be stirred about by the fleeting-dish. Some of it is often heated to near the boiling state, and then lowered to that which is suitable for the state of the curd by cold liquid. Soft curd is scalded with hot, hard curd with cooler, liquid. By scalding it is supposed that any error which may have been produced in the process of coagulating the milk may be corrected; as in what way soever the curd comes, it is by this means brought to the wished-for state.

Some think this breaking and reducing of the curd, or too much of it, should be avoided as improper, by causing too quick or rapid a separation of the whey from it, which has the effect of deteriorating the quality of the cheese. And that scalding the curd before vatting has the same bad consequence, though they may both, in some measure, tend to prevent the rising or hoving that too often takes place in cheeses.

PRACTICES IN BUTTER-MAKING.

As soon as by the business of working, agitating, and keeping the cream or milk in constant motion, the buttery parts are made to form and separate, which is shewn by small bits and particles attaching themselves to the staffs, lids, or other parts of the vessels in which the work is performed, the whole is to be collected together into one lump or mass, either by a peculiar rounding motion of the staffs of the churns, without touching their bottoms, or by some other means which are suitable; when it is to be taken out and placed in a large wooden butter-dish or bowl, with some pure spring or other water, in order to have the butter-milk well washed and squeezed from it, either by the hand or a small dish, by throwing or forcing it against the sides of the basin as may be necessary, as on this much of the goodness of the butter depends. Then, after such milk and the water have been wholly drained from it, and it has been brought into the proper state, which is known by no milkiness appearing in the last washing; a large blunt table-knife, where necessary, may be drawn through it in all directions, to take out any hairs or other matters that may still be in it, as is practised in most of the northern dairies, and it may be salted as thought proper, and made up into the requisite forms. In this business, which requires much dexterity, the great principle is, the completely forcing out the whole of the butter-milk, with the least possible tawing or kneading of the butter; as if such milk be not entirely removed, it will not keep any time, and if the butter be too much worked, it will be tough and gluey, which greatly lessens its value.

Good butter is said to be made in Holland and the Low Countries in this way: the milk after being drawn from the cows is not placed in the pans until quite cold; when it is stirred two or three times in the day with a large wooden spoon to prevent the separation of the cream, and if this be done until the spoon will almost stand upright in it, so much the better. As soon as it is found properly thick, it is put into the beating vessel and beaten for an hour; when, on the butter beginning to form, a pint or more of cold water in the summer, as the quantity of milk may be, is poured in, to promote the separation of the butter from the milk. Then, after the butter is taken out of the churn, it is washed and worked until the last water is perfectly clean and free from milkiness. In this manner, it is believed, that a greater quantity of butter is made from the same quantity of milk; and that it is firmer, sweeter, and capable of being longer kept than that which is made in the usual manner in this country. The butter-milk is likewise considered preferable. The sort of agitating vessel recommended above, is also thought to be the best in this case, as being superior to those of the barrel kind.

In most cases of butter-making, a small portion of salt is mixed with the butter which is designed for immediate use, which is done by spreading it out thinly and evenly in the wooden bowl or basin, and then sprinkling it over regularly with a little perfectly clean salt that has been reduced into a fine powdery state, incorporating them well together by the hand or dish, when it will be ready for use. In the winter, it may be put in a proper vessel with some clean pure cold water for a little time; and in the summer, may be suffered to remain in such water for some time before the making up, which is the proper time for using the salt.

When salted for keeping, the butter is spread out in the basin in somewhat a thicker manner, in different portions, and then proper proportions of fine clean salt are shaken evenly over it, being thoroughly intermixed with it; when the whole has been treated in this manner, it is put together, worked and washed well again as often as is necessary, and then made into the proper forms. In this way it will keep some time. In some places, a neat clean method of this sort is in use, which is by making a suitably strong solution of common pure salt, straining the fluid, and then putting it to the butter, and mixing them well by the hand or dish. In this manner the butter is supposed to have the advantage of being more evenly and exactly salted, and, of course, to be better flavoured. Some persons think, that in making and salting butter, too little water cannot be used, as by its communicating air to it, there is a tendency produced in it to decay more quickly.

The most usual modes of making up butter, is into lumps, rolls, and cakes, with figures imprinted upon them by a proper contrivance for the purpose; after which they are generally put into cold pure water, and placed in some convenient cool situation until wanted.

PUTTING DOWN, OR POTTING AND TUBBING BUTTER.

The season for performing this is early in the mornings, when the weather is cool, any time from the beginning of the summer months, to that of the autumnal ones; but the more early it is done in the month of May the better, on several accounts. When the first of these practices is intended, the butter should not be so much washed with the view of getting the

butter-milk out of it, as is usually the case, but be more fully forced out by working it by the hand or butter-dish, as too much water, by combining the air so fully with it, gives it a tendency to take on a bad taste and smell, or to become what is termed rancid. The quantity of the salt is then to be duly proportioned to that of the butter, which is mostly done by the taste as the work proceeds; but it might, probably, be better and more exactly apportioned by weighing the different substances. The butter is then to be spread out in the dish or basin; and the salt, freed from its lumpiness, and laid evenly over the surface of it, is to be well worked into it by beating and forcing the whole lump of the butter against the sides of the vessel that contains it, until the salt wholly disappears and becomes thoroughly blended with the whole mass. A clean earthen pan or large pot, well-glazed, should be prepared, and in readiness, by having the bottom strewed over with salt; the butter is then to be laid in over it, and as strongly pressed down as possible; and then, if the pan or pot be properly full, the butter may be spread all over the surface or top part with salt, so as quite to cover it; but if not sufficiently filled, some salt should be put over the surface, until more butter be made: the salt is then to be cleared off, and the pot or pan filled well up and covered with clean salt as above. In this state, the butter is proper for keeping sweet and good for a considerable length of time.

The practice of tubbing butter is executed in much the same way, but does not stand in need of having either the top or bottom covered with salt; though it is done in some places, especially on the top surface. In some cases, too, after the butter has been salted, and the tubs or barrels well filled, it is the custom to prepare a strong fine clear solution of salt in boiling water, which when cold, is poured over the butter, and many holes having previously been made through the butter, from the top to the bottom, by means of a small strong wire, they are quite filled with this solution. Then, when the whole has properly subsided and settled, the tubs or barrels are headed and fastened up. The practice of infusing vegetable matters in such briny solution is injurious and improper, as inducing a tendency to putridity and decay or rancidness.

QUANTITY OF BUTTER PRODUCED.

The proportion of butter which is afforded by a certain amount of milk or the cream of it, must of necessity be various, as the circumstances of the cases may be; such as the nature of the pastures on which the cows feed, the richness of the cream or milk, and the length of time they are suffered to stand, as well as the size and kind of cows, and some others; but, on the average, probably, four gallons of milk or the cream from that quantity, will yield one pound of butter; and in dairies the quantities afforded by each cow may be rated at from about five to six pounds in the week in summer, and from four to five in the winter, according as they may be fed. In some districts it has been ascertained, that four gallons and a half of milk give a quart of cream, which yields a pound and three quarters of butter. In general, however, a quart of cream will not produce more than about a pound of butter. In others, in the height of the season, a good cow will give five pounds of butter in a week; and six will make from thirty to forty pounds of cheese of the skim milk kind in a month.

In a large dairy of the Suffolk sort of cows the produce of ten of them, in butter, stands a

below for different lengths of time during the summer and winter seasons.

IN THE SIX SUMMER MONTHS.

The produce of butter at different times was:—

	lbs.
In April,	28¾
	23¾
	26¾
	9
	24¼
	7¼
	119¾
In May,	28
	10¼
	15½
	7¾
	44¼
	18
	23½
	147¼
In June,	43½
	20
	20½
	4
	37
	6½
	62¾
	41
	234¼
In July,	41½
	22½
	18
	13
	25
	16½
	136½
In August	45
	33
	29¾
	30
	33¾
	171½
In September,	29
	27
	23
	23¾
	102¾

Total, . . . 912½ lbs.

Which gives a product of butter in each cow of more than 90 lbs. for this half of the year. In each month, of about 15lbs. 2oz. In each week, of about 3lbs. 12oz.

IN THE SIX WINTER MONTHS.

The produce of butter at different times was:—

	lbs.
In January,	16¼
	17
	17¼
	14½
	65
In February,	12¾
	11½
	11
	9½
	44¾
In March,	10¼
	9¾
	13¼
	15¾
	21¼
	70¼
In October,	18¼
	15¼
	12
	10¾
	56¼
In November,	9½
	8½
	8¼
	9¾
	36
In December,	12¼
	14¾
	14½
	14½
	15¾
	70¾

Total, ... 345lbs.

Which gives for each cow, in the six months, about 46lbs. In the month, of about 7lbs. 10oz. In the week, of about 1lb. 14oz.

Annual produce of each cow, about 136lbs. in butter.

But there are numerous instances in which, with the usual keep, particular breeds and sorts of cows give very large quantities of both butter and cheese. Thus, a red cow of the Sussex kind, two or three weeks after weaning the calf, gave, one year, ten pounds of butter in the week for some weeks; in the next year, nine and a half pounds in the week, for several

weeks; after that, nine for many more; and then, for the rest of the summer season, from eight to eight and a half in the week; and from thence until the hard frost set in, seven; and during the frost, four pounds in the week. In that summer, also, skim-milk cheeses were made from her milk of about six pounds' weight each; and when she gave the most milk, two in the week were made; so that at the height of her milking, she gave ten pounds of butter and twelve pounds of cheese in each week. She never at any time gave more than five gallons of milk in the day.

It may be stated, however, in contrast to this, that a black cow in the possession of the same person, which also gave, in the height of the season, five gallons of milk in the day; but from which not more than five pounds of butter in the week was ever made; it being remarked that the milk of a black cow never gave so much butter as that of a red one. It is not, however, to be supposed, that colour can have any influence on the quality of the secretions of animals; therefore, if the fact be so, it must depend upon some other cause, whether connected with it or not.

With particular keep in the soiling and cow-keeping practices, the quantity of both butter and milk will be still much larger, as appears from the following accounts:

BUTTER.

In the first seven weeks from nearly the time of calving in the two beginning months of the summer season, it was found that from another cow of the same sort sixteen pounds of butter were produced in the week. And in the space of eleven weeks from the end of that time fourteen pounds were produced in the week. In another period of seven weeks from the end of the last, the produce was twelve pounds. Then, in a still further period of fourteen weeks, it continued at ten pounds in the week. In a further period of five weeks it lessened to eight pounds in the week; in two weeks more, to seven; and in one further, to three: thus producing, in these proportions, the surprising quantity of five hundred and forty pounds in about forty-seven weeks from early in May in one year to the beginning of April in the next.

MILK.

In the first of the above periods, seven weeks, it was found to be twenty quarts in the day, or nine hundred and eighty in the whole time.

In the succeeding eleven weeks, eighteen and a half quarts in the day, or in the whole time, one thousand four hundred and twenty-four quarts.

In the third space of seven weeks, sixteen quarts in the day, or seven hundred and eighty-five in the whole of that time.

In a further space of fourteen weeks from the end of the last, twelve quarts in the day, or one thousand one hundred and seventy-six in the whole time.

In a still further space of five weeks, it was eleven quarts, or three hundred and eighty-five in the whole length of time.

For the space of two weeks more, it was nine quarts in the day, or one hundred and twenty-six in the whole time.

And in one week more, it was five quarts in the day, or forty-five in the whole of that space of time.

The average quantity of milk in the day, in this case, amounted to about thirteen quarts and a pint; and the length of time the milking continued to three hundred and twenty-eight days.

The amount of the whole quantity given in these times being four thousand, nine hundred

and twenty-one quarts, which afforded five hundred and forty quarts of cream.

The cow was very carefully, but not over fully, fed, several times in the day, with different sorts of green cut food, and the carrot root, in the summer season, the former being given in a rack in the place, which she could go to at pleasure, not being tied up; in the middle of the day, she had a feed of grains and bran mixed, in the proportion of about four gallons of the former to two of the latter: and in the winter-time her keep was hay, and bran and grains mixed in the same manner as before, being often fed five or six times in the day, and especially when milking; the box or trough from which she fed being kept quite clean and sweet, and the udder well washed at the times of milking with cold water at all seasons, the operation of milking being regularly as well as carefully performed.

As a larger quantity of butter by a pound or more has been said to be produced in the week by a cow of the short-horned breed; and some cows of the same kind are well known to have given more than thirty quarts of milk in the day for a short time; the most extraordinary circumstance in this instance is the long continuance of the milking, and consequently of the produce of butter, which are unquestionably to be partly attributed to the breed of the cow, and partly to the nature of the keep and the management employed. See *Breeding, Breeds of Neat Cattle, Cow-keeping, and Soiling.*

WHEY BUTTER.

A sort of butter which is of a very inferior kind is sometimes made from the whey, where the main object of the dairy is cheese-making. In the making of this, in some cases, the practice is to take the whole of the whey from the cheese tub and put it to stand in pans or dishes for twenty-four hours, and then to cream it, which cream is boiled in a brass pan, and afterwards set in a jar to continue until a proper quantity is collected; but in other cases the green whey is almost instantly taken from the cheese tub, and put into the furnace pan to be scalded. As soon as it has gained the proper state of heat for that purpose, some cold water or white whey is added as necessary; which causes the whey to break and throw up a thick white sort of material that appears somewhat like cream, which is constantly skimmed off as it rises, and put into the cream jar till used. When the green whey is scalded, the runnings, all but the little that is kept for forcing the whey in scalding to throw up the cream, are set in pans or vessels, the same as with new milk, and the cream when taken off being put to that produced by scalding, the whole is prepared in the usual way for making the butter.

During the summer season, about one pound of this butter, it is supposed, may be made in the week from each cow. In making butter from new milk whey, the whey is to be boiled, and in that state some butter milk put into it, which raises the creamy substance to the surface, which is then to be skimmed off and placed in a proper pan, where it is to stand for some time until it becomes in a state of acidity; it is then to be churned, when a good butter of this sort will be produced for immediate use, but which will not keep.

The whey, in these cases, is very useful for the young rearing stock of either neat cattle or pigs, which thrive well on it.

PRACTICES IN CHEESE-MAKING.

The several preparatory operations and other necessary circumstances in this sort of dairying having been already noticed and explained,

we now proceed to the business of making some of the principal sorts of cheese.

CHESHIRE CHEESE.

Though there is some little difference in the manner of making cheeses in this greatly celebrated district, the most general method is to take in the morning a suitable quantity of the milk which has been set over night in the pans or other vessels, after it has been creamed and properly warmed when necessary, and mix it with that of the morning milkings new from the cows, so that the whole may consist of about one half new and the other one meal flet milk, which is found sufficiently rich for the purpose, as when too rich, such large cheeses are liable to be brittle and crumbly. Then, when the whole is become of the proper warmth, which is that of such milk as has been just drawn from the cow, the rennet or steep is to be applied in a suitable proportion, being very thoroughly mixed with the whole of the milk in the cheese-tub, throwing a proper cloth over the vessel to guard against all sorts of dirt and injuries, and prevent the too sudden cooling of the decomposing fluid, which should be kept up as near to and as long as possible the above state of warmness. As soon as the mixture becomes rather thick with a sort of muddiness, and indicates a separation and change in its parts, the whole of it should be well moved about in the tub quite to the bottom, so as that every part may be well mixed and united; then covering the vessel as before, the curd will presently shew itself in separating from the whey; which, after it has in some measure subsided, the wheyey liquid should be taken away from it, by getting it up in the skimming dish and passing it through a portion of thin linen cloth, placed in a sieve set on a proper contrivance over the vessel designed for holding it, by which means any parts of the curd that may be accidentally taken up will be secured. As, from the too varying strength of the steep, in many cases, the curd does not come as it should, then some more steep should be used; when, if that should not have the effect of producing it, a suitable portion of the milk should be taken out of the cheese-tub and be put over the fire in a proper pan, in order to be heated to such a degree as will render the whole of the remainder properly warm when it is poured into it, at which time a little more steep should be added: but, in all cases, care must be taken not to use too much steep, as it has the tendency of making the cheese eyey and strong in the taste. The curd having been thus well formed, and the whey as perfectly separated from it as possible, it is to be put into the cheese-vat, after being cut or reduced into proper sized pieces, or broken well down to drain away the whey more completely. In doing this, in some places, the curd is put into several pans or other such vessels, and those employed in the cheese-making break it with their hands quite fine, scattering and thoroughly mixing salt with it, in a suitable quantity. In making cheeses of such very great weights as these, the processes differ materially from those that are made use of in forming cheeses of the smaller sorts: the curd must be hotter and more broken and reduced in its parts when put together, and be placed in the vat without any cloth in the same way as in other cases, skewring being sometimes used to render it more dry. The great point in these cases being the firm and complete union of the parts, so as to prevent their falling to pieces by completely getting out all the wheyey fluid.

As soon as the whole of the curd has been put into the vat, it will be proper to have re

course to a hoop of tin, so formed as that the two ends which should have been united are left unsoldered and capable of lapping over each other so as to be made to suit any sized vat, which is to be put round it; then placing in the cover or follower, and setting the cheese in the vat on a proper frame over a suitable vessel for receiving the whey that may be discharged. Then, when it has been thoroughly drained, the cheese may be turned out of the vat; into which a clean linen cheese-cloth large enough to enclose the whole when the hoop is on, is to be introduced, forcing it down well on the sides within the hoop by means of the wooden cheese knife when the cheese is in it, and it will then be ready for the press, which should be heavy. See *Pressing Cheese.*

In extensive cheese-making, there should always be a number of various sized vats in readiness, in order that such as are proper for holding the exact quantity of curd that is produced, may be at hand, and no waste made. In filling the vat, it is usual to fill it in a heaped up manner with the broken curd at top; so that when duly pressed, the surface of the cheese may rise within a little of its upper edges, being kept in by folding the cheese cloth over it.

STILTON CHEESE.

In cases where a sound and less brittle cheese of this sort can be made, the method is, to take the new milk of a proper number of cows, and to mix with it an additional quantity of cream, if necessary, so as to let it be properly rich; then to this mixture, in this state of warmth, to put in the steep, as the cooler and slower the curd can be made to come, the richer the cheese will be. When the curd has been fully produced in this way, it is not to be broken, as in making other sorts of cheese, but left to sink to the bottom of the cheese-tub, carefully removing the whey from it, by passing it through a properly prepared sieve-strainer set over another vessel for containing it. As soon as the curd has thus been rendered capable of being taken up whole, or cut into large pieces, if it have still much whey in it, so as to be soft and light, it may be placed in a draining-sieve as before, to become gradually firm and dry, being occasionally slightly pressed. Some persons put it, when only nearly drained, into the vat without a cloth, keeping it together while it drains, by means of a tin hoop slipped within it, putting on the cover or follower, and a very slight weight. On the curd becoming quite dry, the cheese formed by it, is slipped out of the vat by turning it upside down on the cheese-table, a cloth being in readiness to be placed within it, into which the cheese is to be directly returned, disturbing it in the least possible degree: when this has been done, the cover or follower is to be put on so as to slide down within, and the cheese is ready for being lightly pressed, when it should be frequently turned and salted. See *Pressing Cheese.*

The vats used for these cheeses, are mostly of a tall-narrow-upright shape; and deep wooden hoops and cloth-binders, to be put round them, and tightened as there may be occasion, are often employed in forming them.

In cases where these cheeses are more difficultly made, and more liable to heave, the following method of making them may be more safe and proper. Of the quantity of the milk which is intended to be made use of for the cheese, about a fourth part should be set by to stand, until it becomes sour and in a sort of curdled state, the cream having been previously taken off from it, and preserved for use after-

wards. Then, the day before the sour milk is to be coagulated and formed into curd for this use, a proper quantity of new milk from the cow is to be prepared and made into curd; which, after being properly drained of the whey, is to be put into a well glazed earthen vessel, pouring a proper proportion of cold pure water over it. It should continue in that situation for a day and a night, when the soured milk is to be taken, with the cream of it, and more, if thought necessary, together with a quarter more of the previous night's milk, with its cream also, and the whole to be put altogether into the vessel; some of the sweet milk is then to be heated to a proper degree of warmth, and when the steep has been put into it, the whole is to be mixed well with the rest of the milk for curd, which should come very slowly, and, therefore, little steep should be used. The quantity of the watered curd should at least be equal to that of the old milk. These different sorts of curd are then to be as thoroughly mixed as possible, by working the whole over by the hands, when all the curd so-worked is in the state to be put into a proper vat for being lightly pressed. Much of the richness of this sort of cheeses arises from the proportion of cream employed in making them, but not the whole of it; therefore the above proportion will mostly be sufficient for the purpose, as giving that sort of variety in the mouldiness and flavour, which suits different tastes in the consumers.

PARMISAN, OR CHEESE IN IMITATION OF IT.

Early in the morning, take about thirty gallons of new milk, which put into a copper, and suspend it over a slow fire in a suitably cool place, stirring it from time to time; when about an hour afterwards, while just a little warm, press out through a linen cloth into the milk, keeping it well stirred during the time, a small portion of the steep about the size of a filbert nut. The copper should then be turned off from the fire about another hour, in which time the steep has generally worked its effect, and the curd is produced. The whole is now stirred up and left to stand for a short time longer. A portion of the whey is then taken out, and the copper again put over the fire, which is made so brisk as to excite a strongish heat, but below that of the boiling point. A drachm of saffron is at this time put in to give it a little colour, and it is frequently well stirred about, the curd being occasionally felt; and when the small and, as it were, granulated portions are become somewhat firm, which is commonly the case in about an hour and a half, the copper is removed from the fire, and the curd left to fall down to the bottom of it. The whey is then partly taken out, and the curd put up in a coarse cloth, and brought out of the copper hanging together in a tough state, when it is put into a hoop, and a small weight laid upon it for about an hour; after which, the cloth is removed, and the cheese put on the shelf in the hoop. In two or three days it is to be salted by sprinkling it all over, and repeating the same every other day for some weeks.

GLOUCESTER CHEESE.

Some of these cheeses are made thick, and others thin, in consequence of which, they are termed *single* or *double* in many places, the former being much about twice the thickness of the latter.

In the making of this kind of cheese, the curd, after it has been coagulated and made to come in the usual manner, is completely broken down into very small parts, as soon as it has subsided in the whey, or been collected by the dish, round the sides of the tub, the whey having been slowly removed from it, by pressing it with the dish or otherwise, until it has be-

come in a hard state. This minute reduction is effected by cutting it in all directions in the tub or other ways. Then, when it has been reduced to the proper state of fineness, it is scalded by pouring over it in this broken condition, hot water, whey, or whey and water mixed. The soft curd requires the fluid to be more hot, the hard to be more cool. After such scalding liquid has been applied, the whole is stirred briskly about, by which they become intimately blended together, and the business performed in the most even, effectual, and best method the practice will admit. The quantity of the hot liquid that is used, is in proportion to the amount of the curd, so as to make it float well and readily. When, after the whole has stood some time, so that the curd may settle to the bottom of the vessel in which it is contained, the scalding fluid is taken away by skimming or pouring it off, and the curd again pressed as before, until no more whey can be forced away from it; it is then further broken down, and after having a proper quantity of salt united with it, is put into the vat in a cloth in the common manner.

By these practices, the milk can be run more cool, which is supposed to have advantages in making this sort of cheese; as by scalding, any defect in the process can be corrected, as already observed. The great point in the business is that of properly regulating the heat, as when too hot, it is apt to break up in knobs, and when too cold, it will not coagulate freely. About ninety degrees of heat appears to be the most proper for the purpose. The quantity of rennet that is usually employed for this kind of cheese is about one-third of a pint to fifty gallons of milk.

WILTSHIRE CHEESE.

This is a kind of cheese which is made in much the same way as that of the Gloucester in all respects, but differently formed vats are employed for making it in, which give it a very different appearance. These vats are high, round, and of little width, and the cheese in common of a good quality.

DERBY AND MIDLAND CHEESE.

In the making of this sort of cheese, the principal difference consists in the putting the milk and the rennet together more cold, in breaking the curd down very fine, in taking off the whey as completely as possible, and in the using little or no colouring substance. The curd is scalded, as in the Gloucester practice, and the other processes are much the same. The cheeses are rather thin, but of a tolerably good kind.

LEIGH, OR LANCASHIRE, CHEESE.

This is a good sort of toasting cheese, that has little difference in the method of making it to that which is in common use. It is made in rather thin cheeses, and mostly without any colouring matter being used. When they are made in the after-grass season, they have sometimes an eyey weeping kind of appearance, like some of those which are so much valued in some parts of Switzerland.

SKIM-MILK CHEESE.

This is made, as the name implies, from milk which has had the cream taken off from it, and which is not more than a day, or day and night, old, being used while it is perfectly sweet. No new milk is to be added; but supposing it to be sound and good, it is to be put together with the steep, in a state of greater heat than in common cases, and while it is quite free from acidity; when it will frequently prove but little inferior to some sorts of new milk cheeses. In some districts they, however, put the milk and the steep together in a cool

manner, and have very good cheese of this kind. The curd is formed in the cheese-tub in the usual manner; then well drained, but not much broken down, and placed in a cloth in the vat to be only lightly pressed.

This is an useful and profitable sort of dairy-management in many situations and places, as being productive of a good substantial sort of food, from an article of but little value in any other way; while the whey supports many young animals, such as calves, pigs, and some others, in a very thriving condition.

It is much practised in particular districts of the country, as in Dorsetshire, Lincolnshire, and most of the midland and northern counties. These cheeses not being large, become quickly mouldy and ripe.

GREEN, OR SAGE, CHEESE.

In making this sort of cheese, the following method may be pursued: For one of about twelve pounds' weight, take sage, marigold leaves, and parsley; the first in the proportion of about two handfuls, the second in that of one, and the last in but a very small quantity; bruise and steep them in two quarts of new milk for one night; in the following morning strain off the greened milk through a proper cloth, and mix it with about one-third part of the whole of the quantity that is to be run for curd in the making of the cheese. Then the green and the white milks are to be run or formed into curd separately, keeping the two kinds apart until they be ready to be put in the vat. In regard to the manner of mixing them in it, that depends on the taste and fancy of the maker; some simply crumble the two sorts together, blending and intermixing them thoroughly and smoothly, while others either break the green sort into irregular parts, or cut it out with tins made for the purpose into regular and differently-formed figures. In putting the curds into the vat, the different parts and the figures are put on the outsides; but the bottom of the vat is first set with them, the white or yellow curd being then crumbled in among them. As the vat begins to fill, other portions are placed at the edges or sides, and what remains put in flush with the top part or upper surface of the cheese. In the after-management of the cheeses, there is but little difference from those of other sorts.

CREAM, OR YORK, CHEESE.

The practice in making this sort of cheese is extremely simple and easy, consisting only in the mere gradual drying of sweet thick cream without any thing being mixed with it. In forming it, the fine cream of milk, which has stood cool not more than ten or twelve hours, is to be taken and put into a small vat for the purpose, of something more than an inch in depth, about twelve inches in length, and six inches in width, being perforated in the bottom and cover with small holes for taking away any moisture that may be produced in the process; the bottom and top surfaces of which are to be lined by loose covers of fine small rushes sewed evenly together, so that the vat may be turned upside down, as there may be occasion, during the time of drying. These cheeses are to be kept in the rushes.

A good cheese of this sort, but inferior, is often sold as cream cheese, in many places, which is made by mixing new milk and cream, and forming them into curd in the usual way. This sort is not, however, by any means equal to the above. The Bath cream cheeses are probably of this nature, as well as those of many other places.

It is probable that the best sort of cream cheese was originally made in the neighbour

hood of the above town, though scarcely ever to be had there now in its genuine state. It is an excellent sort of soft cheese.

THIN, OR SLIP-COAT, CHEESE.

In making this kind of cheese, new milk is used, mixed with a third part of warm water, to which but a small proportion of steep is to be put: it is then to be covered in the cheese-tub with a proper cloth until the curd be formed; when the whey is to be carefully taken from it without breaking or injuring it; after which the curd is to be removed in a gentle manner out of the tub, and laid in a cloth properly spread over a thin vat, about half or three-quarters of an inch in depth, in order to prevent its spoiling externally before it become cheese internally. It is then ready for pressing, which is to be light and only for a short time, as eight or ten hours. On being removed from the vat, it should be put in some warm place, or exposed to the sun in cloths kept constantly wet. It is a soft running cheese, which, with proper care, is ready for use in a few days.

EDISH, OR COTTENHAM, CHEESE.

This cheese is made wholly of new milk, with which the steep is mixed while in a greater state of heat than in the usual manner of cheese-making. The curd, when come, is carefully separated from the whey, and placed in thin vats of about an inch and a half in depth, in which they are subjected to very little or no pressure, and therefore are ready for use in a month or two. In case they have a tendency to heave, which is sometimes the case, it may be corrected by using the means directed for the sort of cheese described below.

THIN TRENT-SIDE CHEESE.

In making this kind of cheese all new milk is used; and the rennet or steep put to it in a hotter state than in ordinary cases: the curd being come, the whey is removed in the usual manner, when the dry curd is to be put into a thin vat of about two inches and a half in depth, requiring only light pressing for a day and night. As these cheeses are liable to rise or hove, that injury may be prevented by using a little sour milk, or by scalding the curd with whey before it is put in the vat. This is said to be a very good sort of cheese.

EWE CHEESE.

This is a sort of cheese which is made from the milk of the ewe, generally mixed with a little of that of the cow. In the process of making which, the milk is usually heated gently, and coagulated with rennet in the common manner. The curd is then broken down by the hand or a stick by stirring, and compressed by means of a coarse cloth that forces it to the bottom of the vessel, but which allows the whey to rise so as to be taken away by a dish for the purpose. When no more whey can be thus removed, the broken curd is taken up and put into a very stout and coarse canvass bag, which is placed on a strong frame of wood set over a tub for receiving any whey that may come away in the further pressing. Across this bag on the frame is laid a heavy plank of wood, each end of which is strongly pressed down in a jolting manner, so as to squeeze out every portion of the whey that may have been left, which is rather thick and of a white colour. The curd is then turned out of the cloth into a dry tub, broken very small, and salted, when it is sometimes again squeezed to get out any more whey that may have still remained in it. In this case the curd is again separated and worked over by the hand, and, if necessary, a little more salt is added. After this the curd is put into the cheese-vat, and placed

under the press for twenty-four hours. and becomes a cheese, being changed as often as is necessary until it has received the proper pressure. When finally taken from the press, it is laid on a floor where there is a free circulation of air, that it may dry and harden in a slow gradual manner, being regularly turned once or twice every day at first, then every other day, and, lastly, every week, or thereabouts.

The main art, in the making of these cheeses, seems to consist in getting the whey well out of the curd, and giving it due pressure.

These cheeses are supposed by some to be the better, the less cows' milk they contain; they are, however, found the best when it is in about a third or fourth proportion.

The cheeses of this sort often exceed in weight three stone, Scotch; and they have a peculiar relish, being much esteemed by many as good for promoting digestion.

They have lately much increased in price, in consequence of being made in much less quantity.

CHEESE, AND NEW MILK, CURD.

These sorts of curdy substances are not unfrequently prepared and made use of as food.

In the making of cheese-curd, the most ready method is as follows: when the whey of the milk is in the boiling state, put in a proper proportion of butter-milk that has stood some time, by which curd is soon formed and thrown to the surface; when it begins to rise it must be continued to be skimmed off from time to time as long as it comes up; when the whole is to be put in a proper linen cloth, and placed in a sieve or other contrivance, upon a frame, over a proper vessel, for draining. When this process has been sufficiently gone through, the whole is to be tied up in the cloth, and hung up in a suitable situation with the vessel under it to receive any thing that may still be discharged. In this way, in a day or two, the curd will become in a proper state for use as cakes, or in any other manner, which will be found very convenient in many cases.

NEW MILK CURD.

The method of making this is, by putting into a sufficiently large earthen vessel two parts of butter-milk, and then taking one-third part of new milk, which is to be put on the fire until it begins to rise; when it is to be taken away, and placed so as to be somewhat cooled, in which state it is to be put to the butter-milk, and the whole well stirred together; then, after standing for a short time, the curd that has been formed is to be taken off, and placed in a cloth for draining, in the same manner as above described. This is a very simple and useful process on many occasions.

CLOTTED CREAM.

This is prepared by putting the warm milk from the cow into large shallow earthen or brass well-tinned pans, in which there is a little cold water, so as to prevent burning, and to induce the throwing up the cream. Then the milk which has stood from the morning till the middle of the day, and from the evening to the next morning, is steadily to be carried to and put over a charcoal stove or clear slow fire, as being the best for preventing any bad taste that might otherwise be acquired. The heat must then be so regulated as not to let the milk boil or heave, as that would greatly injure the cream. The point of sufficient scalding is very nice and material. It is shown and ascertained by the bottoms of the pans; which, in the earthy ones, when the milk is sufficiently scalded, the pan, from being much smaller at its bottom than the top, throws up the form of

the bottom on the surface of the cream. In the brass ones, the same point is ascertained by the appearance of the surface of the cream; the wrinkles in which then become small, and the texture tough and leathery. The scalding must be quicker in summer than in winter, as in hot weather it would be apt to run or curdle on too slow a fire.

On finishing the process, the pans are to be removed and placed in the summer time in the coolest situations, as on stone floors; but in the winter the heat should be retained by covering them slightly, as too sudden cooling would cause the cream to become thin and less buttery in its quality.

PRESSING CHEESE.

In this business, different sorts require different weights and degrees of pressure. In the Cheshire kind much weight and length of time are necessary, as if they be not well pressed in both the vatting and after pressing, they will not unite firmly and well. From two to three days and nights, in proportion to the sizes of the cheeses, are required in general. The work is performed by placing the vatted cheese in the press, and then applying the proper degree of pressure, as there are in most large dairies two or three presses, each varying in power. Skewring the cheese on the first day of pressing is sometimes useful in getting away any whey that may have been left. The time necessary for the cheese to remain in the press is usually about two or three hours. When taken out, in some cases, it is put into warm or hot whey, in a proper vessel, to harden its outsides, where it stands an hour or more; and after it becomes cool, it is replaced in the vat, which has been wiped dry and prepared with a clean cloth for receiving it, being then again placed in the press. In the evening of the morning on which the cheese was made, it is again taken out and replaced in the vat, with another clean cloth as before, only now the upper becomes the under side. In this way it is taken out, new clothed, and turned in the vat, twice in the day for two days or more, when it is wholly removed from the press, some using finer cloths as the turnings proceed, to prevent impressions being left on the external parts of the cheeses.

Stilton cheeses stand in need of but very light pressing, and are to be frequently turnep while in the press. After continuing from eight to ten hours with the weights on them, they are to be taken out of the vats and turned in their surfaces, repeating the same every ten or twelve hours, for two or three days and nights. The parmesan, also, requires but little pressing, and that rather light. The degrees of pressure required in the other common sorts of cheeses are according to their nature and sizes; but in the cream and other soft kinds, it is always, according to the quality of them, very slight.

SALTING CHEESE.

As soon as cheeses have been finally taken from the presses, they are removed to the salting places, and salted in the customary manner by rubbing fine salt well in on their out sides: but in the large Cheshire and some other large kinds, where the usual method would not be sufficient, beside that which they receive in making, they are sometimes put while in the vats in tubs partly filled with strong salt brine, in which they stand and are turned once every day, for several days; when they are taken out, unvatted, and placed on the salting benches, where they stand for a week or ten days, being carefully rubbed daily all over with salt during that time, and when very large, surrounded by a hoop or fillet of cloth

to prevent their breaking. After being sufficiently salted in this manner, they are washed in warm whey or water, wiped dry with a cloth and placed on the drying benches, where they continue the same length of time before they are wholly removed for drying. Some only keep the new cheeses in the vats on the salt benches, rubbing them with salt as above daily for more than a week, and then removing them from the vats to the drying places. Others salt them while the work of pressing is going on, rubbing them well over with salt every time, after pressing, when turned in the vats, which is sufficient for the thinner sorts of cheeses of most districts. One or other of these modes of salting is proper and sufficient for most sorts of cheese.

DRYING AND PRESERVING CHEESE.

After the cheeses have been salted and are become properly dry, they are taken to the drying rooms or places; in which, after being rubbed over with some suitable oily substance, they are laid on shelves fixed for the purpose, or on the floors, being for the first week or more well rubbed and oiled over daily; but after that period only twice or three times in the week, though they should be constantly turned once in the day regularly as long as they are kept. All sorts of vegetable applications to the shelves or floors are injurious and improper, clean boards and floors being the best and most proper for promoting the good state of the cheeses. All the middling and smaller-sized sorts of cheeses are generally dried on shelves and boards, which should always be kept perfectly clean and sweet by frequent washing with boiling fluid of some sort or other, with the addition of carbonate of lime where there is any fetid smell or taint present. All cheeses should, in such cases, be turned twice in the day for some days in hot seasons, and with the boards or shelves be well wiped over. The drying should go on in neither too rapid nor too slow a manner, as by the former the cheeses will be apt to crack, and by the latter to run into decay; and in either case, in consequence of the deposit of ova from flies being induced in them, vermin will be generated, and much mischief and destruction produced. It is best to preserve the middle state at all times while keeping.

Cheeses are preserved and made to coat properly by the use of different unctuous and other substances, such as fresh butter, animal oil and arnetta in mixture, the powder of red sanders wood, crude ammoniac, and some others. The Cheshire and most other of the common kinds of cheese are usually done over with the oily mixture first, and the other matters applied afterwards, by which the richness of the cheese is secured and a proper state of dryness preserved, which prevents mites and insects of the worm kind from being produced, but especially the former large cheeses should never be placed upon each other while they are in the least in a moist state.

RIPENING IN CHEESE.

This is promoted, in some measure, by an exact and regular state of warmth being preserved in the keeping rooms, though a certain length of time is in most cases required. It is seldom, indeed, that any of the common and least heavy cheeses of any kind can be got ready for use in a shorter space of time than eight or ten months. And the large Cheshire sorts to be *fully ripe*, often require more than two or three years, though they are in general disposed of much sooner by the dairy farmer. A great deal may, however, often be done by careful smearing, turning, rubbing, and other

sorts of management in the store rooms where they are kept.

QUANTITY OF CHEESE PRODUCED BY COWS.

The produce of cheese dairy cows is variously stated, and probably differs much, according to the nature of the pastures or keep and the difference of the breeds or kinds of the animals. The average produce from each cow, in whole dairies, whether they be good or indifferent milkers, in several districts of this sort, is said to be, in some, two hundred weight and a half; in others, three hundred; and in others again, from three hundred and a half to four hundred weight each. Exact and repeated trials have also shewn, that about fifteen gallons of milk are necessary for making about eleven pounds of two-meal cheese, and that one pound of curd is produced from a gallon of new milk. And that as the food afforded by the extent of from two and a half to three and a half acres of land, is commonly supposed sufficient for the support of a cow the year round, by taking the medium of the above three amounts, which is three hundred and fifty-five pounds for each cow, the quantity of cheese produced by the acre will be one hundred and eighteen pounds, which is supported by the authority of many other statements. But, during the summer season, cows will afford from fourteen to twenty pounds of cheese, or more, in the week, where no butter is made.

However, besides the cheese, in this as well as other sorts of dairying, much profit necessarily arises from the refuse products, such as the waste milk, whey, and other such matters. These should be well applied in feeding sows with pigs, in the rearing of young pigs, and in the raising of calves, in the former of which applications, few articles equally cheap answer nearly so well as food; especially when the number of such animals are well-proportioned to the amount of such liquid substances, and when there is ample provision of other sorts made for the store swine. In promoting this sort of swine dairy system, it is of great utility and benefit to have the sties for the swine nearly and conveniently situated, with proper sunk receptacles for containing the liquids, pipes being properly laid for conveying them from the lips of the cheese presses, and other places, so that every thing may be taken away without labour or waste from the dairy-houses or places where they are produced.

It has been stated that in many cases a profit of from seventy to more than a hundred pounds has been gained by the keeping of porker and other young hogs in this way, arising from not more than the produce of twenty-five cows.

PRACTICES IN SUMMER AND WINTER FEEDING AND FATTENING ANIMALS OF THE NEAT CATTLE KIND.

Having explained the circumstances attending the origin of neat cattle; the methods of breeding, raising, and providing them; the various breeds and varieties of them that are usually met with; the different practices in rearing and keeping them, according to different intentions; and the best means of preparing and managing the several products which they afford; we now proceed to consider the particular nature and advantages of the practices of their summer and winter feeding or fattening.

Section XVI.—*Grazing, or Summer Pasture Feeding or Fattening neat Cattle Stock.*

The advantage of this practice, which is that of feeding and fattening cattle wholly, or in a

great measure, on grass in the pastures, must evidently depend on a great variety of circumstances, such as the nature, situations, and qualities of the lands; the stocking them in the most suitable manner, with regard to the size, quantity, and quality of the breed, and especially upon the accuracy and propriety of the methods which are adopted and pursued in the eating down, changing, and preserving the pasture fields for such uses. Consequently, persons engaged in this sort of management, in order to conduct it in the most profitable manner, should not only be perfectly acquainted with the nature, properties, uses, and values of every sort of neat cattle, but be capable of selecting and providing such as are the most proper and best adapted to the nature and state of their feeding grounds, the most suitable for the purposes which they have in view, and such as are the most disposed to take on flesh speedily and become fat in the least time. It is also necessary to understand the proper season when they are to be purchased, and at what rates and prices they are likely to answer fully and pay well for their keep; and, as well as when they are in a condition to be disposed of, to know how to sell them for their full worth and to the best possible advantage. To effect these several purposes in the fullest and most complete manner, it is likewise necessary that they be well informed of the nature, states, and other circumstances of markets in general, but more especially of those in their immediate neighbourhoods, availing themselves by these means of all the advantages which are daily presented.

SITUATIONS AND LANDS MOST SUITABLE FOR THE PURPOSE.

This is a sort of practice in fattening animals which can only be carried on with advantage where the situations are not too much exposed, and where the pastures or grass lands are very extensive and well suited to the purpose in their nature and properties, and their values low in proportion to the fat stock produced from them. In such circumstances, it is not only a profitable, but probably the best and most proper, application of them that can in any way be made; as is proved by the fact that most of the rich fine tracts of grass land, capable of fattening large cattle, in various parts of the country, are under some branch of such practice, and are celebrated for success as feeding or grazing districts. However, in many other situations and places, there are portions of grass land that may be occasionally converted to this use with similar success and profit on a smaller scale by the intelligent stock farmer.

PROPERLY STOCKING, FEEDING, OR GRAZING GROUNDS.

There is scarcely any point of practice in the management of grass land, that requires more exact and correct attention than that of suitably stocking the feeding pastures. It has been justly observed, that in the natural state, such animals are constantly produced, as in their nature and size are most suited to the vegetation and herbage of the particular situation and place, from the smallest on the poor scanty mountain regions, to the largest on the rich marshy pastures; from the small hardy bullock of the northern highlands, to the noble and stately ox on the most fertile feeding lands of the kingdom. Yet that improved cultivation admits of increasing the value of the one in proportion to that of the other; as improved pasture-lands afford the means of keeping a better and larger kind of cattle-stock, a circumstance which strongly demonstrates the

double return of benefits, which the earth makes for any proper attention and improvement that is effectually bestowed on it. The true principle in this business is, to preserve a due balance between such improvements and that of the live stock kept; as they must go hand in hand, and if one be neglected, the other cannot be made fully beneficial. It will, consequently, be first necessary to consider what sort of neat cattle stock will best, and most effectually, answer on the particular sort of pasture-land which is to be employed; and then to ascertain what sort and size of cattle will return the most produce for the keep afforded it. It will probably, in general, be found, that on the strong, rich, full pastures of the more dry, firm, and sound kind, some of the larger breeds and varieties of neat cattle stock will be the most suitable and proper, as paying best for their keep on such lands; while in cases where the grass-feeding lands are neither so rich and luxuriant, nor so firm and dry, and also in that sort of this practice where turnips are in use, some of the smaller breeds and varieties of neat cattle are more suitable and profitable, being more readily fed on such pastures, and better adapted to their situations. The necessity and utility of this discrimination in the stocking and consuming the produce of different kinds of pasture-feeding lands is, in some measure, shown by the practice of several large grazing districts; which, in the rich and full pastured ones, is constantly to make use of the large breeds and sorts of neat cattle; but in those where the fertility and produce are less, the smaller breeds and sorts are as invariably preferred as the most proper and useful. Therefore as the different sorts of grass lands and the different kinds of produce on them, seem to require, in point of profit, to be fed by neat cattle of a different nature and size, it must be useful, and indeed necessary, to inquire into the most proper manner of providing and putting stock upon them.

It is clear, that where such sorts of stock are bred upon the land, there will be little or no difficulty in selecting and choosing those which are the most proper and best suited to the nature of the feeding-ground, and the produce which it affords, or to the views and intentions in feeding and fattening them; but that where they are to be brought in from a distance, which must not unfrequently be the case, much greater difficulty and caution are necessary; as it will in all cases be proper and useful, though a difficult matter, to make choice of those which have been well and sufficiently kept, and which are in a favourably thriving state; as whenever they have been in a shortened state of food, and have an unthrifty appearance, they are almost wholly unfit for this use, and never answer well. It is always proper to bring them from inferior sorts of pasture lands, rather than from those which are of a better quality, compared with those on which they are intended to be fed and fattened.

Beside these several particulars, it is further necessary, with a view to profit in this practice, to be attentive to the habits, properties, and dispositions of the animals; they should be gentle, have the property of taking on, and keeping themselves fat or in tolerable forwardness, by the least possible consumption of food, and be perfectly quiet and easy in the pastures; as on these points a great deal depends, as to their speedy fattening and turning to profit. It has been well noticed, that the quality of quickly becoming fat, is of much more consequence in this practice, than that of largeness of size, without such disposition, as though on the full rich pastures the largest sized beasts may be the most profitable, especially if shape and size be united, yet that form and

breed or disposition to fatten readily, are to be preferred to size simply, as paying better; while on the less fertile pastures and feeding-lands, the beasts, with these qualities, should constantly be well-proportioned to their differences in nature and goodness, it being generally better to have them rather too small than too large; as well with a view to profit, as because there are many large tracts of such pasture-grounds, that will do well for this practice, but which are not sufficiently good and rich to support and fatten the large breeds of such stock.

In buying in and providing proper and suitable neat cattle stock, with this intention, in different cases and circumstances, experience alone can qualify and enable persons to form just and perfectly correct opinions of the nature and proper sorts of the animals that are to be preferred in such cases; such choice being governed by no fixed or determinate rules or principles of a scientific nature, but chiefly and simply by the impression arising from the forms and appearances of the animals; as by the sight, sometimes assisted by the slightest touch, it is immediately known whether the animals which are about to be purchased, are of the suitable sort. If their forms and looks in general please; if they are found every where clean, having little offal about them; if their eyes are bright, full, and vivid; their countenances brisk and strongly marked; their skins alive, and their flesh mellow; if, in short, they have the resemblance of such as have before been found to answer perfectly in similar circumstances of this practice, they are to be selected for purchase. But if, on the contrary, they are such as have never been found to resemble any that have done well, but have a similarity to those which have turned out ill, and been unprofitable, in such cases they are to be rejected. It cannot, however, be doubted, but that there are principles in this sort of management which may be had recourse to with great utility and benefit; as animals have certain points or parts, the just and proper, or bad and improper forms or shapes of which, mark and point them out, as valuable and suitable in this sort of practice or the contrary: such as that the legs should be short in relation to the sizes of the animals; the backs quite straight, broad, and flat; the loins wide; the carcase deep, round, or rather barrel-shaped below; the fore-quarters round, full, and spreading; the bones small in proportion to the size; the flesh elastic in its feel; the skin inclined to thinness; and a disposition in the animals to fatten well and expeditiously on the best and most valuable parts. In cases where these appearances and marks are prevalent in the animals, they are mostly well suited to purposes of this kind. It is supposed, also, that where the hair on the hides of fattening cattle is inclined to curl instead of being straight, they are more disposed to thrive and take on fat: and the same is the case in lean stock. The result of actual trial has likewise shown, that too great attention can scarcely be paid to breed in the choice of fattening stock, as where they are on this account superiorly disposed to fatten, they afford a much larger profit, as in the proportion of nearly three to one.

In the buying in of lean neat cattle stock, where the weighing machine is in use, it will, probably, in general, be pretty near the mark to give about one-half the value of the whole living weight of the animals, as when they are worth from eightpence to ninepence the pound, at about fourpence or fourpence halfpenny the pound live weight.

However, it must of necessity frequently happen, that these circumstances cannot always be fully attended to in buying in neat cattle

stock, as there must at times be great difficulty in procuring the sorts which are in all respects proper for the purpose near to the places where they are wanted; of course, such only can be bought as are at hand and ready for such use, although they may not be perfectly suitable.

BREEDS AND SORTS OF NEAT CATTLE STOCK, MOST COMMONLY EMPLOYED IN DIFFERENT GRAZING DISTRICTS.

Though there cannot be the least doubt, that in the best and most rich feeding pasture-grounds, the large well-formed breeds and varieties of such cattle are the most proper and advantageous, yet on other pastures, those which are equally well formed, but of inferior sizes, are more suitable and beneficial for the purpose.

It has long been the practice in some of the midland grazing districts, to employ the improved long-horned breed of these animals, as being the most readily met with, and the quickest in fattening, and also affording beef of a good quality; while in the neighbouring rich feeding district, a mixture of the large sorts of both the long and short-horned breeds of neat cattle are in use as stock for this purpose, as well as those which are bred there, or brought into the district by the northern or other drovers and dealers in such live stock.

But in the south-western rich feeding districts, the light and dark red sorts, or the middle-horned breed and varieties, have long been in high estimation for this purpose, and have more lately been introduced and spread through several of the midland counties, as being well suited to, and answering more perfectly, on the pastures there. And the same is the case in some other more southern feeding tracts, such sorts being found to fatten kindly, and in an expeditious manner on their pastures, and being also in demand for sale. These sorts are believed, by some, to come next to the more small northern breeds in the fineness of the grain of their flesh and their internal fatness.

In some north country districts, also, they prefer such cattle as are home-bred, and commonly of the long-horned sort, with the two small more northern breeds, the Kiloe and Galloway; the Kiloe being found the quickest feeders, the Galloway the next in expedition, and their own home breds the last or slowest.

The large, or Herefordshire, variety of the middle-horned breed, the large, or Glamorganshire, Welsh breed or variety, and the Suffolk polled breed, are all found good stock with this intention in different situations and places, as the pasture-grounds vary in goodness, and they are capable of being finished out on other sorts of food, as the artificial grass and turnip kinds. Vast quantities of the former of these sorts of cattle, are also bought in for this purpose in the different hay districts, for the purpose of being fattened or brought much forward in flesh on the rich grass-lands, which have been mown for hay, in order to their being completed afterwards by other kinds of food as formerly noticed.

In districts, however, where tillage crops of the artificial grass and turnip sorts are much cultivated and raised for use in connexion with this practice, the several smaller Scotch breeds, as well as those of the Welsh and other runt kinds, are in greater favour, as well on account of their being found to answer better on those mixed kinds of food than other sorts of cattle, as their kindly dispositions to fatten readily, and the excellent quality of their flesh, which never fails to have a ready sale in the markets and places where the chief part of their fat stock is exposed and sold.

Still, in many other districts and situations, on the poorer sorts of feeding lands, the small breeds and varieties of the Welsh, Scotch, and other such sorts may not unfrequently be more suitable and advantageous in affording profit, as they may be better and more perfectly suited to the nature and states of such grounds, and have, consequently, a greater chance of getting fat upon them. And it has, indeed, been stated, on the authority of long experience, that the small animal has in general a more natural disposition to fatten, and requires, in proportion to the large one, less food to make it fat; of course, that a greater quantity of flesh-meat is produced on the acre in proportion to the consumption of food. If, therefore, this point were satisfactorily ascertained, there could not be the least doubt but that small animals would be the most beneficial stock for these sorts of grazing-lands, as well as those of better qualities; but, as the more accurate inquiries and investigations of others of not less experience and authority have led to quite different conclusions, and the matter being now pretty well decided in favour of large animals, where they can be properly kept, it can never be right with a view to profit, to have recourse to the small breeds of such cattle where the large ones can be employed.

SORTS OF NEAT CATTLE STOCK MOST USEFUL IN THIS PRACTICE.

In regard to the kinds of this sort of stock which can be employed in this way with the most profit, undoubtedly oxen of the proper breeds and sorts, and heifers, whether open or spayed, are to be preferred. The former are the most commonly, and by far the most extensively, used in such cases, as having the property of feeding and fattening well, and of affording good beef, both before and after they have been worked in teams; though many persons prefer them in the latter condition, as believing them to take on flesh and fat more kindly, as well as to make better beef, and in a more expeditious manner. The latter sorts, in addition to the circumstance of their being more tame and quiet in the pastures, have the quality of not only feeding and fattening in a still more ready way, especially in the spayed kind, but with a less expenditure of food. Some persons think, indeed, that heifers are superior to oxen for fattening at any age, whether in the breeding state or not, and that they will produce a greater weight of beef on the acre. They are not, however, in most cases and situations, so readily provided or bought in by those engaged in this business. In many cases, too, cows in different situations and circumstances, are bought in for this purpose, as they have become dry suddenly, have slipped their calves in an early state, or have become aged; but in purchasing such sorts of cow-stock with this view, much care and circumspection are necessary, as they very frequently turn out less favourably than those of the bullock or heifer kinds; although, in some instances, they may yield a good profit. When far advanced, or very old, however, they seldom or never thrive favourably or become fat in a sufficiently quick manner. It is, indeed, most probably, the best way, in all cases, to provide such stock as is not too far-advanced in age, as the younger sorts of animals are constantly and universally more disposed to take on flesh and become fat, than such as are old or far advanced, and the flesh-meat which they afford is more tender and delicate in consequence of the finer state of the fibre. On this, as well as other accounts, it is ill-judged to keep working or other cattle too long before they are fed off, and oxen are,

perhaps, seldom or ever so beneficial a stock for this purpose as heifers.

In converting open heifers as well as cows to this use, they should always be suffered to take the bull as soon as they have the inclination, and be so forwarded as to be ready to be sold off in the fat state, several months before they would have calved in the natural way.

Sometimes at the fairs and markets, in the autumnal season of the year, such cow and heifer-stock may be bought in at a cheap rate, and be fattened off in the early spring, when beef is dear, with much profit and advantage.

There is another sort of cow-stock occasionally made use of in this way, as such as have been constantly barren, but they are procured with difficulty, and seldom answer in any very profitable manner.

PROPORTIONS OF STOCKING FEEDING GROUNDS WITH NEAT CATTLE, AND THE MOST FIT SIZES OF SUCH PASTURES, WITH THE MODES OF FEEDING THEM DOWN.

In what respects the stocking and feeding pasture-lands in the best and most profitable manner, it must evidently depend much on their nature and qualities, the sizes and breeds of the animals that are put upon them, and the care and attention which is bestowed in conducting the business, as well as upon several of the particulars which have been already noticed.

In the more southern and western grazing districts, it is usual to allow a good sized ox and rather more to the acre, or acre and half of the middling sort of feeding lands with other sorts of stock; while in the midland, and the more rich adjoining eastern, districts of the same kind, it is common to put from one and one and a quarter, to two and three such beasts on the acre, in proportion to the richness of the feeding grounds, with the other stock. This is a very large rate of stocking indeed; for the oxen running from fifty to one hundred stone weight, of fourteen pounds each, there are on every acre of the lands, allowing them to average forty-two stone, dead weight, three hundred and thirty-six pounds of beef, besides the weight of meat of the other stock, which cannot be less, on account of their size and number; so that in all, there must be nearly seven hundred pounds' weight of meat on the acre in the summer season, independent of the winter produce; an amount so great, as scarcely to be believed but on the fullest authority.

But, though on the rich feeding lands of all the grazing districts of the country, a large proportion of this sort of stock is put on the acre, the true or exact ratio is not at all fixed, but differs greatly in the practice of those who are engaged in the business in different and even in the same places. Nor is the case much different on the less rich or weaker and inferior kinds of feeding pasture lands, as although a much less proportion of neat cattle stock must always, of necessity, be made use of on the acre, in such circumstances, the exact amount of what that proportion should be differs materially, not only in the same or similar instances, but in such as are really different, and in the practice of different persons employed in this sort of management. It is seldom, however, in such cases, that more than two beasts can be put upon three or four acres, with other sorts of stock, but often a much smaller proportion, as one to two or two acres and a half, or more. On both these sorts of feeding lands, however, the differences in the sizes and breeds of this kind of stock, as well as the nature of the seasons and times, and the peculiarity of the management which is practised, will cause a di-

versity in the proportion of the stock that is to be put upon them.

In every case, the great and leading principle, and that which should be constantly attended to, is, never on any account to over-stock in such a way as to stint or limit the animals in their food, but to take care that they may always have a full and sufficient bite, as it is by their having the means of speedily filling themselves, and being thereby induced constantly to lie down and be in a quiet state, that they advance most in fattening in this practice. There is another principle and circumstance in this management which it is no less necessary to attend to, in the view of the most effectually promoting and bringing the stock forward on such pastures, which is that of altering and changing them more frequently than has commonly been done in such cases. Various advantages will by this means be gained; the cattle will not only be more fully fed, and more expeditiously brought forward, but be more satisfied and less restless and uneasy, which are very material objects in this sort of business. It is most probably on this principle, also, as well as the more abundant growth of the grassy herbage, in consequence of the greater warmth and shelter afforded, that rather small pastures are found more expeditious and beneficial in feeding animals than very large ones; but the perfection in this practice is, perhaps, to have them of different sizes and kinds, from eight or ten to twenty acres and upwards, in proportion to the extent of the stock to be kept, and the particular quality or nature of the grounds.

There can be no doubt whatever, that all sorts of perfectly-formed grazing or feeding lands, and especially the richer sorts of them, should be kept well and regularly eaten down, so as to preserve them constantly in an even, level state, without any sort of tuftiness, or as little of it as possible, as by such means there will be the greatest economy effected, and, of course, the most profit produced; as by one part, in such cases, being left higher than another, the long grass always keeps increasing in a patchy manner, and the land where it grows may, in fact, be said to be taken away from the pasture, as the cattle, sooner than eat it, will absolutely almost starve: besides, by leaving the sort of grasses which the animals refuse from one year to another, the land continually increases in such plants as are useless, and diminishes or declines in such as are useful, in consequence of the former sort being constantly allowed to drop their seeds, while the latter are prevented from ever seeding at all, by being always eaten so fully down by the cattle. Therefore the practice which is constantly necessary to be had recourse to on such pastures and feeding grounds is that of *hobbing*, or mowing them over in such patches or places, as by that means the useful plants get room to rise and grow, and those of the contrary kind are ultimately destroyed. There are a vast number of acres of rich excellent land of this nature in many parts of this country, which, from bad management in this way, or the total want of management, and the deficiency of judgment in stocking, become of no more utility or value than the more barren tracts of the inferior sorts of these grounds. Wherever any parts or portions of grazing pastures are seen to be getting into rising benty states, or higher, coarse, tufty grasses than they should be, as shewn by the aversion and neglect of the animals to them, they should be immediately mown over or *hobbed* as close to the surface of the ground as possible, as the closer such coarse parts or patches are cut over, the quicker will the good and sweet grasses rise.

Though the animals might be driven by hunger, in such long states of grass, to eat them, they would not thrive and fatten on such sort of food, as it is not merely the quantity but the quality of it that must be regarded, and the nearer to the ground, or the shorter the grass is, so that there be a sufficient bite, the sweeter and more nourishing it is, and the better it is suited to such purposes. A further proof of the benefit of keeping such feeding pastures well eaten down, and in a rather short even state of grass, is, the common observation, that pasture land of this kind, which is good in the spring of the year, goes off afterwards; and which, though considered as extraordinary, can create no wonder, when it is considered, that one third, or perhaps nearly one half, of such extent of pasture is become so rank and coarse, that not a single animal in the field will touch it. Every one knows, too, that if the very best piece of grass land that can be found, which is wholly free from weeds, be suffered to lie without the grass being either eaten or mown off, that in a little time it will be much overrun with weedy herbage, have but very little good or useful grass on it, and be, in short, in little better than a rubbish state of produce.

There can, of course, be little doubt of the advantages of close feeding or heavy stocking on the older and more rich grazing pastures, as by such means they are preserved in the best and most suitable states for fattening the animals put on them. But on new-lays or lately laid-down pastures, such a practice should probably be but seldom, if ever, attempted, as great injury and mischief may sometimes be done to such new pasture lands, without any adequate return being gained from the stock put upon them.

Some are of opinion, that such intentions are the best and most fully and completely effected on all the rich grazing or feeding lands by a mixed stock, such as neat cattle, sheep, and horses, as each of such sorts prefers some grasses or herbs as the most palatable and agreeable to it, which the others reject and have an aversion to, and that though not one of them will ever bite near where their own excrement has been dropped, they will near that of the other kinds; consequently, that in conjunction they may contribute the most perfectly and effectually to keep the pastures even and level in the feeding them down, without incurring expense in other ways. In this manner, it is believed, the grass, in such cases, may be eaten off most cleanly and regularly, and that thus the injury arising from the want of their being so exactly fed down would be best prevented.

Of the propriety of under-stocking or mixing sheep with neat cattle, in the view of keeping the feeding pastures in the best and most even order for the profitable fattening of the stock on them, there can be but little doubt, as by the nature of their bite they are well calculated for the purpose; many, however, object to horses, as disturbing the other animals and driving them about, by which their feeding is much retarded, and sometimes almost wholly prevented. They are, therefore, to be introduced among other sorts of stock, on such lands, with great caution, and in a very sparing manner, where it is at all practised. See *Sheep* and *Horses*.

Where the pasture lands of this kind cannot be kept down in a regular and even state, favourable for the practice of grazing, without mowing, or what is provincially called *hobbing*, that method must be had recourse to, in order to get quit of the tufts or tussocks, though it should always be as much as possible avoided. But when, in wet growing seasons, it becomes absolutely necessary, on account of the coarse

grasses and plants rising so very rapidly, the sooner such work is done the better, as if *hobbed* while young, the hayey material which is gained will be eaten by store cattle. It is always best, if possible, however, to preserve the necessary evenness in feeding grounds by hard stocking them, rather than by the custom of mowing or *hobbing* off the tufts of rough grass or plants that may infest and injure them, as in this way they will be kept in the proper state for feeding in a more easy, ready, and less expensive manner.

TIMES OF TURNING THE STOCK UPON THE PASTURES IN FEEDING, AND THE MODES OF MANAGING IT ON THEM IN SUCH CASES.

The neat cattle-stock should seldom, if ever, be turned upon the feeding pastures in the spring season, until such time as the grassy herbage has attained a sufficient growth, maturity, and fulness, or until there is what is termed by the grazier, a *full bite;* which, if it be the natural grass, will rarely be the case sooner than towards the middle or latter end of April or the beginning of the following month; but where it is of the artificial grass kind, it may, in some cases, be rather earlier, though it is the safest way never to be too early in putting the stock upon any sort of feeding ground, lest the continued progress of the fattening process should be in any way checked or wholly stopped, by cold and other accidental circumstances, before the fine warm season sets in, which would be very injurious afterwards, and cause much difficulty and trouble in getting the stock so affected forward again. When the neat cattle stock have been put upon the grounds, scarcely any thing further will be necessary, but the occasional inspection and examination of the beasts, every few days, to see the progress in condition they make, prevent or remove any inconvenience or accident that may shew itself among them, and take care that the large, heavy, inactive, animals, properly and fully supply themselves with food, as from their indolent nature, and large size, they may sometimes neglect so completely filling and distending their stomachs, as may be requisite to their taking on flesh and fat in the most ready and profitable manner. Indeed, it is in this particular, that the chief necessity of always having a good and rather full bite of grass on the feeding lands, depends. And, on the same account, in all cases, such large heavy cattle stock should invariably be removed to and put upon fresh full pastures in sufficient time, before the grassy herbage of those on which they are, begins to decline and get so thin and low, as to give them much labour and difficulty in collecting it, so as to properly promote their fattening. For without due attention to this point, it may often happen, that they do not go regularly on in the improvement of their condition, but keep at a stand, or rather go backward, any of which is a loss of profit to those engaged in the practice. The feed that is left in these pastures by such heavy and more forward stock, may not unfrequently, be wholly eaten off and finished with advantage by young lean store neat cattle or other proper stock.

At all times, even in warm seasons, and especially when rains are constant and lasting, for want of due shelter and protection in such pasture grounds, the feeding neat cattle stock are often left so exposed as to be greatly distressed and hurt by their bodies being so excessively steeped, as it were, in such a cold watery fluid, by which their natural perspiration is frequently so greatly restrained and checked as to disturb the economy of their systems, and thereby bring on a sort of feverish

dulness and loss of appetite, which puts a total stop to any further improvement in their fattening, and causes great loss. This, together with the thin washy nature and quality of the grass arising from the same cause, are the reasons why the animals are almost without nourishment when they want it so much, and when such food is apt to scour them, and thereby to add to their weakness. Upon the sounder sorts of such feeding pasture grounds, however, the stock mostly escape without any other bad effects than that of the suspension for a short time of their improvement in the fattening process; but on those which are more low, damp, and moist, such as fens and marshes, the consequences are generally much more injurious; as, if they then escape becoming diseased, they commonly in a week or two, or in a very short time, lose as much flesh and condition as many months were necessary to have produced in them, and a long time is requisite to restore them to their former thriving habit and disposition, so as to be completely fattened. The prevention and removal of such mischief and loss must necessarily depend on attention to the giving proper shelter and protection, with suitable food of the dry kind, such as cut hay or straw to the beasts, as soon as it may appear that the pastures as well as the stock are much affected by such continued moisture and wetness; and it may often be necessary, as well for convenience as for the safety of the cattle, to remove them to the driest and warmest places that can be provided, where proper grass food and dry meat can easily and conveniently be conveyed to them; due protection and warmth in all such cases being strongly recommended.

In turning stock of this kind on the natural grass feeding pastures, whatever their nature or quality may be, little care or attention is necessary to the animals' avidity of feeding; but in the rich fogs or aftermaths, and in those of the artificial grass kinds, much precaution and exactness of management are requisite on their being first turned into them in order to guard against their over-feeding; in which case their stomachs become morbidly swelled and distended, so as to suddenly destroy them in some cases; a mischief which is more common to cow stock than to that of the ox kind. The most ready and easy mode of preventing such effects is, that of blunting the keenness of their appetites by letting them be well fed just before they are turned upon them for the first bite. Some are in the practice of constantly attending them for several hours at their first entrance, to prevent such excess in their eating. While others are in the habit of driving them constantly about in a gentle manner with the same intention, which seems the worst method from the trampling produced. Any of these practices will, however, answer perfectly; and there is, probably, little or no difference whether the pastures in their herbage be wet with much rain or quite dry when they are turned upon them, as some prefer one state of them and some the other.

THE PROGRESS OR INCREASE IN WEIGHT AND PROFIT IN PASTURE FEEDING OR FATTENING NEAT CATTLE STOCK.

This is evidently a matter which must depend upon a variety of different circumstances, such as the nature and state of the feeding pastures or keep; the breed or particular kind of the animals; their different dispositions to feed or take on flesh and become fat; and the habits which they possess of being tame and quiet, or the contrary, as well as some other causes. From various statements it appears, that large stock of the ox kind increase about

three pounds in the day each beast; while in those of the smaller sorts the increase is not more than about one and a half. It is of course very clear that such large sized stock is the most proper and beneficial for those rich feeding pastures on which they can be fattened, and also for being made fat on the more expensive kinds of dry food; as, taking the price at only eight-pence the pound, the former will pay two shillings a day for their keep, when the latter will only afford half of that amount; while the difference in the consumption of food is often very immaterial, and, in few cases, more than a fourth part less in the small than the large animals of this sort, which are equally good of their kinds, as many correct trials have fully demonstrated. Large oxen are in many cases well known to increase on good feeding grounds in the summer months from four or five to nearly six hundred pounds each in the course of from twenty to twenty-five weeks; but as the last is an uncommon and extraordinary profit, it may be more properly stated, that a beast of this sort, of a good kind, in the lean state, the live weight of which is about eighty-five stone of fourteen pounds, taking the dead or carcase weight at one half, which is more than it is in such cases, and allowing the above price of eight-pence the pound for the whole, full, or living weight, or which is the same thing, four-pence the pound for the dead or carcase weight, the animal will be worth about twenty pounds to buy in; and to afford a fair average profit, it should increase in weight three hundred pounds, and be sold for about thirty pounds. The expense of fattening which, the first cost of the beast, the rent of the land on which it is fed, taking it at an acre and a half, (and it cannot probably be less), for taxes, and the interest of capital, will be about twenty-five pounds four shillings and four-pence, leaving a profit, with the under stock, of about five pounds fifteen shillings and seven-pence, supposing the beast to increase in the above manner and to be sold at the prices stated. The usual profit is, however, somewhat less, as a fifth or more

But in the smaller sorts of neat cattle stock, even admitting their increase in weight to be in the same proportion, they will not afford the same amount of profit: they have, however, other advantages; they take up less time in completing their fatness, and are capable of being made fat on poorer sorts of land; and, by their becoming fat more easily in the summer, they gain better prices in the markets. The main advantage in the keep of them is, however, in the first three or four months. Their use and advantage, whatever they may be, and their increase in weight will, however, most probably, be the best shewn by stating that an ox of this size, weighing about sixty stone of fourteen pounds, bought in at four-pence the pound for the whole or living weight, or double that price for the dead or carcase weight, which will be about fourteen pounds; the increase in weight in four months' keep being about one hundred and eighty pounds, or about eleven pounds in the week, the animal will be worth twenty pounds, or thereabouts, and pay from seven to eight shillings the week for its keep. The charge of fattening, in this case, in the first cost of the beast, the rent of the land necessary for the purpose, allowing the same extent as before, the taxes, and the interest of capital is about seventeen pounds ten shillings and three-pence, leaving a profit with the under stock of about three pounds nine or ten shillings each beast.

In some districts, in times when the prices are moderate and the sorts favourable in their dispositions for fattening, lean oxen are bought

in at two shillings or two and three-pence the stone, the weight which they will reach when they are fat, or from three-pence to three-pence half-penny the pound; which, supposing the beast when fat to be sold at four-pence half-penny the pound, it makes the profit of fattening on the lean weight of the beasts to be nearly three half-pence the pound, or about eighteen pence the stone of fourteen pounds; which is equal to about nine-pence the stone living weight.

In these statements, the great advantages of large-sized stock and rich full feeding or grazing grounds are strongly shown and enforced, as well as the disadvantages and loss of small-sized animals and the inferior sorts of feeding lands, pointed out; as it can scarcely be doubted, from the facts that have been brought forward, that in many cases such large beasts, where they possess ready dispositions for fattening, will increase as much in weight as the whole of that of a small beast, in the course of but a few months; but this is a profit or advantage that can only arise or take place on feeding lands of the best or very good qualities; as in raising such large stock in flesh and fat to such great weights, there requires much better and more abundant keep. They are also necessarily kept in many instances and situations for a great length of time before they become ready for being fattened; and consequently do not suit cases where lands are poor and capitals small.

In the small-sized stock of this kind the case is materially different in most circumstances; they can be raised to their proper weights on inferior keep and the poorer sorts of feeding land, with less expense of food; they are ready for taking on flesh and fat in half the time of the others; but the increase in weight is less, and the produce or profit smaller; yet, under good management, two such beasts may be fattened in nearly the same length of time as one of the others, and with less danger of accidents; still, however, the whole of the amount of the produce or profit will only in certain cases and circumstances come up to or surpass that of the large beast in such extraordinary instances, which can seldom or ever occur when the latter is got ready for fattening at the earliest possible period.

MOST BENEFICIAL MEANS OF GRAZING.

In grazing cattle with a view to profit, three points or circumstances should be particularly attended to, which are, first, to raise a full quantity of artificial grass for hay and aftermaths; secondly, to turn a large quantity of ground into rich pasture, by feeding it, dunging it, and laying on it other proper sorts of manure, to bring it into suitable order and fit for raising the bullock or heifer in flesh and condition in the spring, when they come first from hay to grass, and in order to receive them with a vigorous aftermath when other grass, as the clovers and the second crops of aftermaths, go off; and, thirdly, to provide hovels, sheds, or other buildings, enclosed with not too confined or close walls, to shelter the cattle from winds and heavy rains. By adopting and pursuing these methods in pasturing neat cattle on the feeding grounds, the grazier from having plenty of hay, will be enabled to purchase barren beasts before the spring grass comes in, when they are cheap and may be bought to much advantage, allowing for the value of the hay they may eat; and if by winter haying some meadow ground, after it has been kept high in heart by feeding and other management, he can, early in the spring, by such means, take off such grazing beasts from hay to grass, before the clovers can be ready, it will be advantageous in many places, as they

are often as late as the second week in May; and then by keeping such meadows for an aftermath, which, towards the end of summer, are in very good heart, he may support his bullocks and carry them on when the strength of other grass fails. All fattening cattle, whether barren cows or oxen, require a proportional progression from coarser to finer and better food or keep as they grow more and more into good flesh and condition; otherwise, when half fat, they will frequently go back, when the grazier cannot, without great difficulty, raise them again, which of course is a great loss of profit. Every kind of feeding pasture is fitted to raise animals to a particular size and condition of flesh; but the larger the breed the richer and sounder should be the soil, and the fuller and more abundant the produce.

WATER NECESSARY IN GRAZING NEAT CATTLE.

Good water is of the utmost consequence in rearing and fattening neat cattle, and those graziers will never meet with much success or profit whose grounds do not abound with a continual supply of this fluid; indeed beasts cannot thrive well without it, though the grass should be in the greatest abundance. Bullocks require a large quantity of water to dilute their food, and in the summer time delight to chew the cud in pools or rivulets where they may enjoy a cool retreat, and with alternate vibrations of their tails defend themselves from the troublesome attacks of the flies, gnats, and other insects which infest them. Ponds, rivulets, or some other contrivances for retaining water, are therefore absolutely necessary in all sorts of feeding grounds.

SYSTEMS OR MODES OF PRACTICE IN GRAZING.

In some feeding situations, places, and districts, where they are in the practice of preferring open or spayed heifers and other barren kinds of stock to oxen, the beasts are bought in as convenient and proper for the purpose in March, or the following month; and, after being kept and pushed well forward through the summer season, when having been well fed out, they are sold off in October and the succeeding month. This method is not so convenient or ready as some others, but is considered by some persons to be profitable in its nature.

A second and more usual method of practice in this business, is, that of buying the beasts in lean as soon as the grass feeding lands are in condition to be turned upon, that is in May or earlier; and wholly completing the fattening of them on the pastures towards the latter end of October or later, according to their quickness in feeding. In this practice of summer pasture fattening stock, the smaller breeds and sorts of good feeding neat cattle will probably be the most beneficial, except where the pastures are of the more rich and luxuriant kinds. And it is more convenient and profitable than some of the modes noticed below.

A third mode of feeding or fattening this sort of cattle stock is occasionally had recourse to, which is that of buying in the stock at such periods of time as that in proportion to the differences in their sizes, kinds, and properties for fattening, they may be ready to be sold off about the beginning of April, or very early in the following month; at which times they commonly bring a remunerating price to the grazier. In this mode of practice, large oxen or other kinds of beasts may be kept through two winters, giving them only one summer's grass; not feeding them so fully or well in the first winter, but keeping them in good feeding grass pastures in the ensuing summer season. In

the second winter they should be forced on with the best house or yard feeding, so as to be ready early in the succeeding spring. But with smaller-sized sorts of such stock, one summer's grazing and a winter's stalling or yard-feeding is the common practice in such cases; the stock being bought in as early in spring as the grass has risen to a good and full bite. These are in general less beneficial practices than either of the two methods that have been already noticed, and probably less so than that with roots in combination with grasses and pasture feeding, as described below.

A still further mode is, that of buying in neat cattle-stock at the fairs and markets in the end of the autumnal or the beginning of the winter season, namely, the latter part of September, or early in the following month and that of November, chiefly keeping them through the remaining winter months on straw, mixed with a little hay, until about the beginning of March; then continuing to push on their fattening through that and the succeeding month, by some sort of rich juicy food or keep, such as the common or Swedish turnip, the carrot, parsnip, beet, and potato, in connexion with cut lucerne, tares, or other early artificial grasses, until the natural pasture grasses be in a fit state or condition for being turned upon in the early part of May: on these they may be carried properly forward, and completed in their fattening out, according to circumstances, either in August or the succeeding month.

There is another mode of practice of this nature, that is deserving of particular attention in a local view, which is, that of buying in small-sized neat cattle-stock, as those of the runt, or other quick-feeding little kinds, which are in forward or tolerably fair condition, in the early autumn, as soon as the after-grasses or after-maths are ready, for the purpose of fattening them out upon those grasses, and selling them off towards the latter end of October or early in the succeeding month. This is a method of management which is not unfrequently pursued with success in many rich hay districts throughout the kingdom, and especially in the vicinity of the metropolis.

There may be some other systems of this sort of management in use for feeding and fattening neat cattle stock in particular situations and places, but these are the most usual, and may be sufficient to shew the nature and means of effecting the business under different circumstances.

MANNER OF SELLING OR DISPOSING OF FATTENED NEAT CATTLE-STOCK.

In the business of selling off neat cattle, after they have become fat and fit for the market, much nicety and attention is required, in order to effect it in the best manner. The most advantageous and proper times for effecting the business, where there is a choice; the most suitable and convenient markets or places for the purpose; and the most economical and ready, as well as the most favourable and least troublesome, modes of accomplishing the desired object, are all to be well weighed and fully considered. Then the proper worth of the beasts are to be fixed upon, which is mostly done by the eye and the feel, where the seller has had sufficient experience, but the most expert in this way are often greatly deceived. Some sort of direction and judgment may be obtained by carefully attending to the length of time and the nature and manner of fattening in the stock while they were at grass in the pastures: but the best and only true and real method of ascertaining the point is, by the occasional use of the cattle-weighing machine. In this way, by a carefully exact comparison of the living

with the dead, or carcase weights of the animals, their values may be sufficiently well known. It is by the numerously repeated comparisons of the living with the dead weights of such stock, that the butcher, in many instances, has so much the advantage of the grazing manager in deciding on the worth of animals, whether in the lean or fat state, as by practice his knowledge is more perfect and exact.

There are other points in this sort of management, in which the occasional weighing of neat fattening cattle may also be beneficial, as it may show the different gradations in the progress, which they make in different periods of time, and various sorts of pastures, as well as what the effects of different kinds of food and keep are upon them; what sort of changes may be necessary and proper in them: and when it may be the most desirable and proper to sell, if markets suit. It likewise may be thus ascertained, what is the cost, and, consequently, what the profit in each for their keep. By this method of proceeding, a sort of confidence is gained, which cannot be easily acquired in any other way.

The contrivance of the weighing-cage will readily and conveniently determine the living weight in fattening, suckling, or other, calves, and may be necessary to the suckling-house. See *Suckling Calves.*

Section XVII.—*Soilings or Summer Feeding and keeping Neat Cattle in the Houses and Yards formed for such Sorts of Stock.*

This is the practice of keeping and supporting neat cattle of all sorts, in the spring and summer months, on different kinds of green food cut from the ground daily or oftener, and given to them fresh in the houses and yards where such stock are kept, in such places as are constructed entirely for the purpose; which is probably the best method. The plants of the grass and other kinds which are capable of being used in this way with advantage are very numerous, as being all such as have a quick luxuriant growth and full nourishing properties, such as lucerne, winter and spring tares, rye-grass, red clover, cow-grass, trefoil, white clover, sain-foin, natural rich grass, and several other kinds. There are likewise many plants of the root and top sorts, that might be employed in the same way with great economy and benefit, as there would be little or no waste, while the beasts would be supported in the best manner, such as those of the carrot and parsnip kinds, the several sorts of beets, and perhaps some of the cabbage-plant tribe, as well as others. Less attention has, however, been bestowed upon this practice of giving such cattle stock their keep in the hotter months of the year than its superiority in economy and utility appears to demand. For, without attending sufficiently to these points, it has been the common and usual practice in almost every part of the country, to suffer all kinds of this sort of stock to be grazed or fed in the pasture fields or enclosures, never supposing that there was any other way in which they could be better and more cheaply kept, under many circumstances.

ADVANTAGES WHICH RECOMMEND THE PRACTICE, AND GROUNDS ON WHICH IT HAS BEEN OBJECTED TO AND DISREGARDED.

The chief points and circumstances which recommend and enforce this mode of practice in preference to that which has been in more general use, in many cases, are those of a

larger number of what have hitherto been considered useless plants and grasses, as well as of such as are well known to be useful, being employed; such food being made use of and consumed with far less destruction and waste, which, of course, makes it go very considerably further in keeping the stock, than when it is eaten off on the land; the support of the cattle being more regular, better attended to, and more perfect in consequence of their feeding in a less interrupted and inconvenient manner; and their being shaded more fully and effectually from the too great heat of the sun, as well as their being better protected and more free from the attacks of insects and flies. On all these accounts, there can be no doubt, it has a great superiority over the common mode of letting the stock range in all directions upon the pastures. It has been well noticed, that if the food or plants and the consumption of them in this practice be a matter of much regard, it is plain that the benefits and advantages to be thence derived will be of very great and material importance. Since long experience has proved, in the most clear and satisfactory manner, that such sorts of cattle will eat with much avidity many grasses and plants, when cut by the scythe and given to them in such places, that they never would touch while growing in the field or pasture; and that whatever may be the cause of it, they eat them, not only without showing any signs of dislike, even when they are not pressed by hunger, but they frequently devour with much greediness such food and plants, as soon as they have been brought in from the field or pasture where they were feeding, and before they could possibly have had time to become hungry. It is well known, too, that some of the finer grasses and other plants, which, when young, are most palatable as the food of such cattle, are, if once suffered to get into ear, so much disliked by them, that they will never taste them unless forced by extreme hunger. Consequently, as in most pastures many of such grasses and plants get into ear from different causes, their produce in such cattle-food must be inevitably lost; whereas, if they be cut down by the scythe in proper time, not a single plant of such grasses will be suffered to get into such a disgusting and nauseating state, and, of course, no loss or waste will be sustained on such account. Besides, it may be further noticed, that the few such plants and grasses as may be wholly disregarded and loathed by one set or sort of animal, so as to be even rejected by them in the house or yard, will not on that account become less acceptable or desirable to others; but often the contrary. So grass or other such food, which has been *blown* or much *breathed* upon by any animal, becomes unpleasant and disgusting to any other beast of the same sort, but not so to stock of another kind or variety. Nay, even greater states of taint and injury done to such matters by one sort of animals, appear to render the food, afforded by such substances, more desirable to others: thus such straw, as in the clean state has been refused by neat cattle, if used as litter in stables, acquires such a relish, that they seek and eat it with much greediness. In consequence of this, the matters swept up, collected, and cleaned out, from the places where one sort of animals have been kept, in this practice, may supply, in some cases, those of another kind with an agreeable sort of fodder, as they can be easily removed from the feeding place of one to that of the other; but which in the field or pasture method of being fed must be in a great measure lost or wasted.

Several objections have, however, been brought against this practice of foddering and

keeping this sort of stock, but probably by those only who have had but little, if any, experience in this mode, as facts and the results of the most correct and exact trials are uniformly against them. Some persons have supposed that a great objection to it lies in the expense of conducting the business, which they consider a great deal too much. But all the trials which have been made on the subject with sufficient accuracy, and in a sufficiently extensive manner, have clearly shewn and proved, that when properly practised, it is capable of being executed at a charge so trifling, in proportion to the value of the beasts individually, that no real or solid grounds of objection to this sort of management in such cases can be found.

The practice has been opposed by others, on the supposition that the beasts or stock do not thrive so well in it as in pasture feeding. But as it is well ascertained, that the more quiet, easy, and free from all sorts of annoyance and disturbance, neat cattle are kept, the better and more readily they thrive and improve in their flesh and condition; it is, consequently, not very probable, that fresh cut green or grassy food, when eaten and consumed in the sheds or other parts of cattle-yards, will be less beneficial in forwarding the growth and condition of such stock, than when eaten off from the pasture-field. It must be recollected, too, that in the pasture-fields the beasts are exposed to the great heat of the sun, and to perpetual attacks of various sorts of stinging and biting animals of the fly or other kinds, and, of course, are kept in a continual state of irritation and restlessness. The extensive and most minute and correct trials that have been made in actual practice in this way, have, however, proved that the cattle have always thriven better, and fattened more expeditiously than others of the same kind, size, and age, fed and kept in the pastures, even in the most favourable years and seasons for the purpose. Facts do not, therefore, support such supposition, which appears to have had no foundation in actual experience, but to have been wholly taken up on conjectural grounds, while every fact and circumstance strongly contradict it.

There are still some others who contend, that cows in milk do not afford that fluid in so abundant a quantity when kept in this manner, as when kept by feeding in the pastures, which, however, is in perfect contradiction to all experience, as will be fully seen below. It is well known, from actual trials, that almost every one of the various sorts of green crops that have been cut by the scythe and made use of in this manner, have more full and lasting effects in exciting and promoting the secretion of milk, than the common pasture grasses. Yet, as there may be some sorts of plants and vegetable productions, as well as other matters, that may have a more powerful action on some of the glandular or secreting organs of such animals than others, it is not improbable but that there may be some kinds of such plants and vegetables, that may have a greater and more continued influence in promoting this kind of secretion than those of other sorts; so that cows fed on one kind of such food, in this management, may give less milk than when supported in the same way on other sorts, which is also the case in feeding them on common mown grass, and grass of the tare, clover, and other such kinds.

It has been suggested, likewise, that this method may be less proper than that of the pasture support of the cattle, in consequence of their feeding or eating the food in a more imperfect manner, from their being confined, and wanting the more full and open air, as well as ex-

ercise of the field: but where there are proper yards and other suitable contrivances for the purpose, nothing of the sort need take place in this mode of feeding, as they ought not by any means to be kept constantly tied, or shut up in a close manner.

There are, therefore, no solid reasons of any kind which can in the least affect the propriety and great utility of the soiling method of feeding, keeping, and managing neat-cattle, but it has much to recommend it in the preventing of waste, and in making grass land go much farther in the supporting of such stock, which are considerations of great consequence in the providing for such animals.

The great superiority of this practice in the saving which it produces in the consumption of the food cannot be questioned, as the various extensive trials that have taken place fully prove that it is by such means made to go from two to four or five times as far as when eaten off on the land, and in some cases much more. And in different other trials with natural grass, lucerne, tares, and clover, they have been found, in this mode of use, to be capable of supporting from three to five and six times as many neat-cattle in better and more full condition, than in the pasture manner of feeding them; and it has been remarked, that in this last method, great waste and destruction must often necessarily be caused by the grass being so much trampled upon, trodden down, dunged on, and in other ways, especially where the quantity of cattle fed together is large; and that, of course, most, or all of such sorts of waste, are prevented in this method of proceeding. Beside, the poaching and injury to the land in that way, which is often very great, is in this wholly avoided.

It is not, however, to be supposed, that all the waste is by pasture feeding, and none at all in this way; as by soiling, some little waste is occasionally incurred in different manners; as in tare crops that have become podded, on account of the bottom parts of them getting coarse, sticky, or in a state of decay, in consequence of their resting so much on the ground, and thereby become rejected by the stock; and the same with lucerne when in full flower, as well as with some other plants of such kinds. There is occasionally loss, too, in the heating of the food or grassy matters when heaped together in the carts or other places, if suffered to remain in such situations too long, and in some other ways of still less consequence. Yet, whatever such waste may be, it is clear, from much experience, that soiling is beneficial in better supporting stock in the proportions already stated, and according to the nature of circumstances.

EXCELLENCE AND UTILITY OF THE PRACTICE IN PRODUCING MANURE.

Another circumstance, in which this management in keeping neat cattle stock has a great advantage over that of the pasture method, is that of the very large quantity of good manure which it is capable of raising and providing when well and properly executed, on which the increased culture of many sorts of crops and the extended improvement of tillage as well as grass lands materially depends. In the usual mode of pasture-feeding, every thing of this sort is dissipated, wasted, and lost, by many different causes, and is rather injurious than useful to the land where it is deposited. The method by soiling, on the contrary, is extremely and particularly well contrived for the production of this material in an abundant manner. The increase in the quantity of the urinary and other discharges of the animals, the extent of litter capable of being employed, and the ma-

terials which are scattered over the yards and other places, are readily and easily changed, and reduced into manure of a very useful kind; and by such means, with proper care and management, the most plentiful supplies of such manure may be procured, where in other methods there would be none at all, which is a point of particular importance in favour of this sort of management. It is not improbable, but that, by such means, the summer produce in manure may be made to equal, if not exceed, that of the winter supply, and at the same time surpass it much in quality, as there is reason for supposing, that the manure supplied by any sort of neat or other cattle when fed in this way, if not in the state of fattening, is much better and more rich in its properties in the summer months than in those of the winter, as abounding more in ammonia, mucilaginous, and rich animalized vegetable matters. The quantities of such excellent manure, as with sufficient care, may be raised in this manner, in some cases, is hardly to be conceived, except by those who have been largely in the practice of it. With a view to the more effectual and ready decomposition and conversion of the littery matters into manure, it is of much consequence to have proper receiving places for the urine and other liquids, which should be frequently thrown over them in the cool of the day. In this way, much benefit is often produced, and such liquids prevented from being evaporated and lost. In particular instances, four large wagon-loads of dung perfectly rotten, or more, have been made from one cow in the season in such practice.

In order to gain and ensure the greatest possible benefit from this practice, it is, however, necessary to have a very nice and strict regard to several points and circumstances in the management; such as those of having perfectly suitable, proper, and convenient buildings and yards for the purpose, providing necessary and proper crops in due succession, and in suitable extent to the proportion of stock that is kept, the foddering, cleaning, and managing the animals in a regular and proper manner, and the fully providing of different substances for use, as litter in the houses and yards. Suitable directions for each of which, are given below, under their proper heads.

PROPER BUILDINGS, YARDS, AND OTHER CONVENIENCIES FOR THIS PURPOSE.

As much, in what respects the economy of labour in foddering and supplying the cattle with different matters, and in the forming and preparing the manure in the best and most extensive manner in this practice, depends on the buildings and yards which are made use of in the business, it is necessary that they should be properly and suitably formed, and have all the conveniences and advantages possible in their plans and arrangements. Above all, it is essential to have well and suitably formed open or close shed buildings, with properly sized divisions in them for tying up and containing the animals while eating their food, proper racks, cribs, and boxes being fixed in them for the purpose. The yards should be immediately connected with them, and so designed as that a large portion of them may be laid over with littering matters, having proper floors for the purpose; and the other parts should gently shelve or incline to a watering pond or place. By such means and contrivances every facility and advantage may be gained in conducting and carrying on such business.

Some persons, however, to save the expense of time and labour in clearing out and removing the dirt and filth caused by this method, leave the cattle wholly loose in the yards, so

as to eat their food from racks or cribs without any sheds, the bottoms of such yards being prepared and laid with marl or any such matters, as are proper for such use, a coat or layer of litter being spread out upon them, so that the urine may be taken up and retained in such a way as to promote the forming of it into manure; but it is, probably, a far better and more beneficial practice to have them fastened up in the divisions of such sheds as have been described above, especially in the nights and while eating their food; for notwithstanding there may be some saving of labour in the simple yard method, there are in the former the advantages of the manure being better, and that of the animals being kept in more quietness, as well as being less interrupted and inconvenienced in consuming their fodder. In either of these modes the cattle should, however, be so separated and divided as that those of the same ages and sizes may be foddered and kept together in distinct divisions of such sheds and yards, in order that the smaller and weaker may never be injured or incommoded by the larger and more powerful, as is always the case when both sorts are kept and fed together loose in the same place.

In regard to the divisions, in the simple shed manner, and that of the shed and yard plan, some have found oxen and cows to do well in those of seven feet in width, each division containing two such animals fastened to the sides by their necks, being thereby prevented from injuring or incommoding each other in the time of eating their food. For smaller stock, six feet may answer very well, and perhaps less in some cases.

CULTURE OF CROPS PROPER FOR, AND MANNER OF USING THEM, IN THIS PRACTICE.

It is a necessary part of this practice to raise and provide such green and other crops of the grass herbage, root and top, and any other such sorts that can be well and properly employed, especially those which have been already noticed, in a sufficiently full and ample quantity in proportion to the number of the animals, and to secure a proper succession of them, which is so requisite and material in this method of proceeding. For the most early use and application, there should be a due extent of the lucerne crop, on the deeper and more rich sorts of land, and of the winter and other tare, on the stronger and better sorts of loamy land, in a proper state of preparation and condition for their full growth; the latter being sown so as to come in at different times in such early foddering of the cattle; and the former sown broadcast, or drilled in rows at six inches' distance, in order to be more abundantly productive, and to bear the early cutting more perfectly; the first crop of winter tares should succeed the early cut lucerne, the later put in crops of the same tare kind succeeding that; after which the rye-grass and red clover on the mellow loams will be ready in most cases, to which another crop of the winter tare, and the second cut of lucerne will succeed; when still later, these being finished, the spring tare crop may be in readiness, and be followed by the third cutting of lucerne, cow-grass and white clover, with sainfoin on the chalky lands, when the rich natural grass will be in a proper state for being cut if required. At different times in the more early parts of such foddering and keeping, the roots and tops of the common and Swedish turnips may be occasionally used in small quantities with much advantage; and in the later periods those of the carrot, parsnip, beet, and some other such kinds will produce the utmost benefit from the practice.

There are other plants and crops, as those

of the cabbage and cauliflower kind, that might be used in this way with much propriety, and perhaps advantage; but from the number which have been mentioned above, it is probable that they will seldom and in but certain situations be wanted; and with so many others the cut natural grasses will rarely, if ever, be much required, though they may beneficially be made use of in this manner, whenever it is necessary to employ them.

PROPER MODES OF FODDERING THE ANIMALS IN THIS PRACTICE.

Much in this practice depends on properly supplying the stock with their food and other matters. One important regulation is, never to suffer the cattle to have too much food given them at one time of foddering, as whenever this is the case, the heat of the season inducing such grassy matters quickly to ferment and take on some degree of putrid taint, they become wholly rejected or only very slightly picked among, and a waste is caused that may by properly allowancing them be wholly avoided. Besides, it cannot be doubted but that by having such sorts of fodder given more frequently, and consequently in a more fresh state, the cattle will thrive in a better and more expeditious manner, as well as the least possible loss in food be sustained. As stock feeders in this way are commonly inclined to over-feed, it is quite necessary to be attentive at all times to their conduct in this respect, as much of the advantage of the practice rests on it. In providing the daily supplies of food great attention is likewise necessary. It should never on any account be suffered to remain for any length of time closely packed together in the carts, or other conveyances, but be immediately spread out in its proper situations before the stock; and, in order to save time and trouble, the best and most ready method would be, to have the sizes of the carts, or other contrivances for carrying it, adapted to the exact consumption of the stock, calculating for two or three fodderings; that the whole, or at least a certain part of it, may be at once readily and conveniently distributed in the cribs or racks of the houses or yards where the cattle are kept.

Where the supply for the day is collected at one time, the carts or other contrivances should be provided with a number of light open frame divisions, according to the number of fodderings, in order that too much grassy matter may be prevented from being packed too closely together, and that the several different portions may thus be more conveniently distributed out to the stock. It is material, too, that the crops to be used in the soiling practice should not be suffered to advance too far in their growth before they are used, as by proper attention to this point they may be consumed by the cattle with more regularity and with the least possible waste.

It is further particularly necessary to the perfect success of this practice, that the cattle themselves be kept quite clean and free from every sort of dirt and nastiness, as well as their cribs, racks, boxes, or mangers, and other places; that there be plenty of good water for them to drink whenever they may be so disposed; that their food be given to them as above with the least possible delay or injury; and that they be either wholly turned out into the yards constantly after eating their fodderings, or have the open air for some hours every day in the summer months in the cool of the evenings, and in the mid-day when the season becomes more cold. Advantages would also be produced in the condition and growth of the beasts, as well as in the increase of some of the products afforded by them, by having the

different sorts of such keep properly varied and employed in alternation with each other.

NECESSARY SORTS OF LITTER AND THE ADVANTAGES OF THEM IN THIS METHOD OF KEEPING CATTLE.

In this system of management, litter is a material of much utility and importance, as in consequence of the very large proportion of fluid matter, which is produced and collected in it, from so much rich juicy food being consumed, a very great mass of such littery substances are speedily capable of being decomposed and brought into the state of manure by the constant operation of such moisture with the heat which mostly prevails. Therefore, in cases where proper supplies of straw for this use cannot be had as they may be wanted, it becomes highly necessary to provide sufficient quantities of other suitable matters in the winter season, or at other times. Many different substances are capable of being used in this way, such as the stubbles of tillage lands, fern from heaths, commons, and other places, sea ware or tangle from the banks of the coasts, aquatic weeds of various kinds from the sides of rivers and ponds, and a variety of other such matters, should be cut and collected together in their dry states where abundant, in order to be stacked up near the yards for this use, at a future period. Besides these vegetable substances, several earthy matters may sometimes be employed with much benefit under the litter, such as reduced peat earth, mould of the loamy kind from fresh banks, different sandy materials, and other such bodies, all of which are very powerfully acted upon and decomposed, by the various gaseous and other matters, which are formed and set at liberty during the decomposition and reduction of the several vegetable littery substances deposited in such feeding yards.

APPLICATION, UTILITY, AND PARTICULAR BENEFITS OF THE PRACTICE.

This method of management is useful and well suited for the keeping of neat cattle in general; but it is more particularly beneficial and better adapted to some cases and circumstances than others. It is quite suitable and convenient where the grass pasture lands are of the more soft and poachy kind, and the stock of the large and more heavy sorts, as tending to keep such pasture grounds in that condition which is the most desirable and advantageous, while at the same time, the cattle are well brought forward, kept, and supported. The same is also the case where the extent of pas ture is small, while that of tillage is large, and the quantity of neat cattle stock considerable, as such stock can in this way be well supplied with food from the arable part without having recourse to the grass portion. Indeed, in cases where the lands are wholly arable, this is probably the only practice from which such great and extensive benefits and improvements can result, as furnishing the means of further amelioration and a more full and abundant produce, at the same time that the cattle stock are fed in the best manner and kept in the most perfect condition.

In cow-keeping or dairying, whether for the providing of milk in general, or for its different products, or for its sale in different situations and places, it is a practice also of prodigious utility and advantage, especially near large towns, where proper pasture lands are scarce and of high value; as more full supplies of milk are perhaps afforded in this method of keeping milch cows in the summer months,

than in any other. It has been applied in this way, in many parts of the country, with very great convenience and advantage, both in increasing the quantity of milk and in keeping up the condition of the cows.

In the summer fattening of cows, as well as other beasts, there has been much benefit also derived from this practice in different cases where the several plants and roots noticed already, have been used in the manner directed above. With many of such substances, as well as with plants of the cauliflower and early spring cabbage kinds, where they can be well grown, beasts have been fattened in a very speedy manner, and the finest and best flavoured beef produced from such food, other suittable matters being combined and given at the same time with them.

SECTION XVIII.—*Winter-Fattening in the Stalls and other Places, or Stall-Feeding Neat Cattle.*

THIS is the practice of fattening cattle in the winter season, on different sorts of moist and dry substances, instead of grass. It was formerly a disputed point, whether such stock could ever be advantageously fattened when tied up or fastened in stalls or other places; but numerous facts, the result of extensive trials, have now most satisfactorily, and in the fullest manner, proved, that it is the best and most beneficial method that can be had recourse to for the purpose at that time of the year; and, that, from the great utility of it, some practice of the same, or a similar kind, should even be more resorted to in the summer keeping of cattle, than has yet been the case, as has been shewn in the preceding section.

In this sort of fattening, great care and attention is necessary, in many respects, as will be fully described hereafter; but the most convenient, least wasteful, and the best method in forwarding the condition of the beasts and completing the business, is, most probably, that of not wholly confining them to the stalls or houses, but letting them out occasionally. For instance, when the weather is suitable, they should be turned out two or three times in the day into the yards, in order that they may indulge more fully in their natural habits, that their desire for food may be sharpened, and the danger of being disgusted or cloyed with it avoided; by which regulation, they will feed or take on flesh, and fat in a more ready manner, and the process of fattening be more expeditiously and perfectly effected.

The large breed of short-horned cattle are generally the most proper in this intention, and stand the practice in the best manner.

MODES OF FEEDING IN THIS WAY.

In winter fattening beasts of the neat cattle kind, there are several different methods pursued in different districts and parts of the country: in some, (in the more southern parts especially,) it is a common practice to have the food when of certain root sorts, eaten by the stock, upon some perfectly sound, dry, and convenient portion of sward or stubble land, to which it is taken for the purpose. This method can, however, be only made use of in cases where such sorts of land to some extent prevail, and where the smaller sorts of such stock are employed, as there are but few instances of ground being so free from wetness at this time of the year, as not to be greatly injured and broken up by the treading of heavy cattle. Less perfect managers in some places, leave the crops of such kinds so as to be eaten by the cattle on the land, but which, in all cases, is a bad and wasteful practice. The method which is the most useful, and attended with

the most advantage, is, therefore, in all probability, that of feeding the cattle in the stalls of shed-houses, connected with suitable yards for turning them into occasionally as may be necessary; though that of confining them wholly to the stalls is in the most common use, as in all the ways of feeding or fattening such stock on the ground in the fields, there is the almost insuperable objection of the loss of so much rich and valuable manure, as must always be formed in such cases. Besides, from the greater exposure and other circumstances, the cattle cannot possibly thrive so well. In some cases of this practice, the cattle are at first only brought to the stalls during the nights, but afterwards constantly tied up in them.

TIME OF BEGINNING AND CONTINUING THE PRACTICE.

It is usual to begin this method of feeding about the time when the pastures and aftermath grasses fall off in their supplies of food, or are quite finished; as towards the end of the first winter month, continuing during the whole of that season, and until the spring begins to be a little advanced. The commencement of this practice is, therefore, precisely when cattle can in general be the most readily bought in and procured for the purpose; and the termination of it, that at which beef usually brings the best price in the market, and the stock, of course, sells the highest, which are advantages in its favour of some importance to those engaged in the business.

SUITABLE SHEDS, STALLS, AND YARDS, FOR THE PURPOSE.

The houses or buildings and stalls for this use are, in general, badly contrived in several respects, being in common too much exposed in their nature and situations to cold winds and rains, which have a great deal more effect in checking and retarding the thriving and fattening processes than is usually supposed; as a due degree of warmth may fairly be said to be as necessary in these matters as that of the food which is consumed; for, in nearly the same degree as such effects of the weather are prevented, will the cattle get forward and become fat. Far too little attention has, indeed, been bestowed upon the natural habits, constitutions, and dispositions of the cattle in the construction and fitting up of such buildings and places; while vast expense has often been incurred for contrivances which have no relation whatever to the economy of the animals. Among the latter are what are frequently termed keelers, for holding water, fixed up in each stall, and to each of which, the water is separately conveyed by pipes or other means; they are mostly of the same size and capaciousness as the mangers for containing the different roots and other such matters, and the separate divisions for meals, oil-cake, bran, chaff, and other such like substances, without their being intermixed, and are put up to some proper height, level with them in the fore-parts of the stalls, just before the heads of the beasts for the ease and convenience of their feeding, as well as to prevent the labour and trouble of letting them loose and taking them to the water. But the natural habits of cattle are to take their food of all sorts from the surface of the ground, and their water from ponds, pools, and rivers, or brooks, which method is the most favourable to their health, and, of course, to their thriving and feeding or fattening. They do not stand in need of any such costly accommodations or contrivances, but eat their fodder and provisions more keenly, and with better effect when laid on the ground or from low situations, than when put in such mangers, boxes,

or troughs, as the results of the most careful and exact trials have fully proved. Besides, there is less smell and nastiness produced in this way than by such confined contrivances, and both the taste and smell of neat cattle are extremely acute and nice. It is, consequently, only necessary to have proper shallow spaces for holding the provisions and fodder nearly even with the surface of the ground with moveable divisions, so that the whole may be readily well sweeped, washed, scrubbed, and cleaned out, daily, or oftener if needful; and with respect to their water, the beasts should take it while loose in the yards, at the ponds or other places.

The divisions for the stalls in such buildings should be rather roomy, about ten or more feet in width, not being closed in the upper parts; in which two beasts may take their food while fastened up for the purpose, the floors or bottoms being formed so as to slope gently backwards to the heels of the cattle, where there should be a step six or eight inches high, with paved gutter, two feet or more in width, for receiving and conveying off the urine and other liquid matters, as they drain from the stalls.

In connexion with these feeding-houses and stalls, there should be proper and convenient littered yards with ponds or other watering places in them for receiving and containing the fattening cattle, when not tied up in the night-time and bad weather. The best manner of constructing such yards has been already specified, and their utility and benefit in such sorts of feeding sufficiently shewn; though they have been objected to by some, on account of the great waste of food where used without such houses and stalls for giving the cattle their food in, and for protecting them in cases of cold and bad seasons. The waste, when fed loose in such cases, has been stated to be prodigious; nine beasts, in this way, having been found to eat and destroy as much hay as twelve tied up: it must be noticed, however, that there is not the least doubt that cattle eat more when loose in such yards, than when tied up in close stalls and fed in the usual manner, so that the real waste is less than it at first appears to be. But the utility and convenience of such yards is obvious in connexion with the feeding-houses, for turning the cattle into occasionally in the day-time for the purpose of air and exercise, whilst their stalls and houses may also be more completely aired and sweetened, as well as more thoroughly cleaned out.

It has been well observed, that in or near such feeding-stalls and yards, the weighing machine is always a necessary and useful apparatus in this method of fattening cattle, in order that it may be almost instantly known what is the state and progress of the animals, and that the improvement in them and the expense may be compared; or the flesh, and the food necessary to produce it. By this means, a neglected inquiry of the greatest importance has been laid open; which is that of finding out the breed or variety of neat cattle which gives the *greatest* quantity of *flesh* with the *smallest* quantity of *food*. No complete building and yard of this sort, on any considerable scale, should ever, of course, be without such a contrivance, as without this sort of assistance, there are but few who are able to decide correctly, whether the cattle go on profitably or the contrary; while by the use of it at short intervals of time, when the beasts are the most empty, this point may be perfectly determined, and the management of the animals, in all respects, be regulated in the best way for effecting their fattening.

PRINCIPLES ON WHICH THE FATTENING PROCESS DEPENDS.

In the process of fattening animals, a somewhat larger proportion of food than that which is exactly necessary and proper for supporting and keeping them in good condition, is constantly required, in order that a greater quantity of the nourishing material may be prepared from it, and converted into blood, and the substances to be laid on or added to their several parts in the form and manner of flesh and fat; which is a circumstance that would seem to depend materially upon regularly and steadily keeping up the stimulus and action of their bodies to that high state, by proper rich fodder and keep, which has a tendency to cause a sort of dulness, weariness, and inactivity in them, these being the states most favourable for rest, sleep, and quiet, which numerous facts and long experience have fully shown to be the most suitable and proper for depositing or laying on flesh and fat in those parts of their bodies which are destined for them. Of course, it follows, that the manner of giving and distributing the food, in such cases, must have great influence and effect in promoting or delaying the feeding or fattening process; for, if the greatest nicety and attention be not had recourse to in such matters, much loss may easily take place, particularly when the richer and more costly sorts of keep, of whatever kind, are employed.

Upon the same principle it must be highly beneficial, in such fattening, to have the animals kept as perfectly clean in themselves as possible, as well as in their stalls and places from which they eat their food; having always a due degree of warmth and protection, but not too much, as by such means that unthrifty tightness and binding in the hides, which so often takes place, and denotes their not going on well, may be much avoided; while their disgust of food, which is mostly occasioned by the putrid smell arising in the places where they are confined, may, in a great measure, be prevented; and the fattening process proceed in the best and most profitable manner. It may also sometimes be greatly useful in expediting such feeding, where substances of the rich juicy and those of the hard dry kinds are used at the same time, to have them given in such states of combination, as that the too loosening and evacuatory effects of the one may be counteracted by the constipating and constringing qualities of the other, and thereby the bowels of the animals be preserved in the middle state, which is that which is the most suitable for the purpose of fattening. A somewhat soft or medium state of the dung has, indeed, been found the most proper for the feeding as well as thriving state of neat cattle. Such combinations of the different sorts of these kinds of food, especially where the more bulky, dry, hard matters, are used in connexion with the more nutritious, but less bulky, moist substances, may likewise have a beneficial effect in another way, which is that of giving distention and stimulus to the stomachs of the animals, and which are probably necessary and serviceable in expediting the fattening process, as without this sort of fulness and distending stimulus the beasts cannot be induced to take in food, chew the cud, and have their rest so completely. It is on this account that in mankind a full and satisfying meal cannot be made of flesh-meat alone, without the use of some distending material, such as bread. Consequently, on such a principle, in stall-feeding, hay, chaff, cut strawy substances, or some other such matters, always become necessary to be joined with the rich moist sorts of food, that

are not capable of being made use of in such quantities as to afford the proper degree of fulness and distention.

SORTS OF FOOD, OR PROPER MATERIALS FOR THIS USE.

The substances and matters which are capable of being made use of in this practice are extremely numerous; but they may probably be divided into three kinds: as those of the rich juicy root and top kind; the moist grain, wash, and sweet, malted, or saccharine kind; and the dry, mealy, floury, oily seed, chaffy, cut strawey, and hayey kind. In the first of these classes or divisions, the substances may perhaps stand somewhat in this order, so far as their useful qualities are concerned; carrots, parsnips, beets, Swedish turnips, cabbages, common turnips, potatoes, and various winter green crops. In the second class, distillers' wash, malted grain and pulse, coarse sugar, treacle, or molasses, and brewers' grains. And, in the last division, the flours and meals of several sorts of grain and pulse, linseed, bruised or in jelly, oil-cake, corn in the straw, hay, chaff, and stover, cut bean and pea-haulm, and common straw prepared by cutting.

All these different materials, or articles of food or fodder, are used to most advantage and profit, by being combined with some one or more of the other sorts, so as that all or most of the desired effects may be produced in the best and most complete manner; such as the rich juicy roots and plants, and the moist, sweet, substances, with those of the hard, dry, and rather bulky, proper kinds, and the contrary. In the preparation of them, in general, the less that is done the better; the several roots, for the most part, only stand in need of being slightly cut or chopped, the different meals of being coarsely ground, the rich powdery matters of being imperfectly reduced in their parts, and the hayey and strawey materials of being either cut or left wholly in their natural states, as circumstances may direct.

It has been suggested and believed by some, that great utility and benefit may be produced in this practice of fattening, by having particular kinds of roots, such as those of the potatoe and turnip, prepared by boiling or steaming; and there can be no doubt at all, from the number of trials that have been made on the former, that its nutritive properties are greatly increased by such means of preparation, as something hurtful is thereby dispelled; yet it is probably best to make use of them in the raw state, not only on account of the saving of expense, but also that the beasts may chew them more in eating them; as whether in the raw or prepared state, they should be chewed as much as possible, and it seems more likely to be completely done in the former than the latter case. When in the cooked state, they should, consequently, if eaten alone, be as little as possible broken down; or be coarsely reduced and mixed with sheaf oats, hay, or straw, not cut too short, in order that such an effect may take place in the most perfect manner.

There is less necessity, in most cases, for cooking or preparing other sorts of roots than that of the potatoe; and, besides, in many of them, there is a great deal more waste and loss in the practice, which most clearly shews the impropriety of the measure, especially as there must always be considerable expense attending it. Therefore, whenever the nature of the roots will admit of being used in their raw conditions, it is by far the best and most profitable method; and in such cases they should never be prepared by cooking in any way.

PROPORTIONS IN WHICH THE DIFFERENT KINDS OF FOOD ARE CONSUMED AND FOUND USEFUL.

The exact amount or proportion of the several sorts of these kinds of food, that a fattening beast will profitably consume, in a certain time, must be very different under different circumstances, such as the nature and feeding disposition of the animal, the size, the manner of conducting the business, the state of the season, and a variety of other causes; so as to render the just proportions not easily ascertained. But they will generally be found to average nearly as stated under the several heads below.

CARROTS.

With these roots, in some trials, beasts of sixty or seventy stone weight, have been found to consume in the proportions of from ten to eleven stones, of fourteen pounds, in the day, having a due quantity of cut chaff or hay at the same time. Used in this way their nutritious properties have also been found to be very considerable, being nearly, if not quite, equal to any other sort of food employed for the purpose; and having the capability of fattening the large sorts of this kind of stock. They are certainly an excellent sort of food in this intention, though considerably expensive in many places. The great expense of taking them up may, however, be avoided, in most cases, by the use of the uncoultered plough, carefully employed. Some persons believe, that the best and most profitable application of this sort of root is, in the feeding or fattening of bullocks. When such roots have been kept until they are become somewhat dry, less of the hard firm sorts of substances are required in this practice, such as hay, chaff, or cut straw, than in the cases where they are used in their fresh juicy state. In fattening oxen these roots have been valued at from sixpence to eight-pence and ten-pence the bushel. The crops of this root are raised to most advantage in the deep, rich, light, earthy, or sandy and earthy soils.

PARSNIPS.

These roots are usually given to fattening beasts in the proportion of about seven or eight stone in the day to each, in quantities of about two stone and a half, of fourteen pounds each, three times in the day, with supplies of hay or other cut dry fodder, between such feeds. These roots are at least quite equal to the above in fattening neat cattle, accomplishing the process in a very ready manner, and producing beef of a highly juicy kind, and fine flavour. But though the quantities of nourishing matter contained in each may be much the same, there may be some difference in their fattening powers, though it has not been yet shown in any satisfactory manner. Where this sort of crop is good, it is estimated that about thirty perches of it will be sufficient, in the course of three months, to fatten a beast of three or four years' old, from the perfectly lean state. And that an acre of either of the two roots will afford produce sufficient for finishing the fattening of two beasts of such weights as those noticed above, when taken from the pastures in the half-fattened state. If the crops be full and good, much more than this will often be done. These roots are grown in the best and largest manner on the more deep and free good loamy sorts of land.

They are eaten voraciously by the beasts in this application, as well as those of the carrot kind. It has been found from many trials, that these two sorts of roots, though inferior in some degree to oil-cake in their fattening properties, are yet the nearest to it of any in these

respects; and that, consequently, the culture of them should never be neglected where it can be beneficially attended to. These crops have been largely made use of in stall-feeding cattle, in many places, with great success.

BEET-ROOTS.

As the different sorts of roots of these kinds, though they possess the same nutritious properties, as those of the carrot and parsnip, yet from their having them combined in a different manner, their being less in quantity in the same weights of their substances, and the amounts of some of their other constituent matters probably being smaller, much larger proportions of them are necessary than those of either of the two roots of a similar sort, which have been already described. It is probable, that not less than fourteen or fifteen stone, of fourteen pounds each, of any of them, and much more of some, will be requisite in the day, for fattening a full-grown middling-sized beast; but the proportions of dry fodder, of hay, or chaff, need not be quite so large as with some other sorts of roots. The best way is, perhaps, to give from four to five stone four times in the day, of the smaller kinds of these roots, with hay or chaff in the intervals. Of the larger sorts, a full-sized beast will consume, in the day, from two to three bushels, with a suitable quantity of dry meat, something less than a bushel being given three times in the day. An acre of such beet crops has been found to keep and feed a middling-sized bullock for about two hundred and fifty days, at about three bushels in the day.

On good, rich, deep soil, the acre will produce from fifteen to twenty tons of this large sort of the root; but of the smaller, a much less proportion.

SWEDISH TURNIP.

The Swedish turnip is a root which is very usefully employed in this way, for fattening neat cattle in a much better and more expeditious manner than the common turnip; and when produced on land which suits it, it produces an equal or greater proportion on the acre. It also has the property of being more nourishing in consequence of its greater solidity, as well as of being more hardy, and therefore capable of being made use of at a later period in this sort of fattening. It is employed in about one third less proportion to the weights of the beasts than the common turnip, as stated below, and requires somewhat less than the usual quantity of dry food to be used with it. These are all advantages that would seem to render it a cheaper food than that of the common sort of turnip, and, of course, to be preferred to it in all cases where it can be raised in an equally easy and convenient manner. Some persons, however, are inclined to think less favourably of it than of the common kind; but there can be no doubt, from the different correct trials that have been made, that when given in a proper manner, it has much more power in promoting the fattening process, is far better suited to the practice, and possesses qualities that are a great deal more beneficial in several respects. It is only the bulb part, as in the common turnip, that is to be used in this intention of feeding such stalled stock.

CABBAGES.

Many trials of the most exact and attentive kind have proved that beasts, in the course of the day, eat or consume somewhat nearly in proportion of one fifth of their weights of these vegetable matters: consequently, that a beast

of about sixty stone will consume such substances in the proportion of about twelve stone every day. A beast of eighty stone was long ago ascertained to eat fifteen stone of such food in the day, with half a stone of hay. These vegetables have long been known to be an excellent food, in connexion with different sorts of dry strawey fodder, for keeping store neat cattle stock in the winter season; and that when given in combination with good hay, it is capable of fattening large cattle of the same sort in a ready manner. The properties of this sort of food are said to be so considerable in this way, that beasts of eighty stone weight, put to it in the beginning of the winter, in low condition, have become in a state of perfect fatness in the early spring, mostly increasing in their value from five to nearly six pounds in the space of about four months. Consequently, that, in this proportion, an acre of this sort of crop of thirty tons, would be sufficient for stall-feeding three beasts of the same size and weight. But in most cases, the produce of crops of this sort is not much more than half that quantity. At the rate of four bushels a day, the same space of crops has been found to keep a middling-sized bullock one hundred and eighty days, with a small quantity of cut chaff. In general, an acre of good cabbages may be nearly equal to the fattening of three beasts of about forty-five stone weight each, that have been pastured on the feeding grounds during the summer season; but a medium-sized animal of this sort will often consume in the proportion of one hundred pounds of this kind of food in the space of twelve hours.

There can be no doubt that cabbages have the quality of fattening cattle, both more readily and in less proportion than the common turnip: while the produce on the acre is larger, being in the proportion of about twenty-five to fifteen. And an acre of such crops has been found to fatten one in four more than the same breadth under the other kind of crop. Cabbages are therefore an excellent, though rather expensive, kind of food, when used in this practice.

COMMON TURNIPS.

These are roots occasionally used in stall-feeding neat cattle, but on account of the largeness of the quantity which a beast daily consumes of them, not so much employed as many other sorts of food. The usual proportion in which they are commonly given is about a third of the weight of the beasts. In some careful trials, not much less than three hundred weight of the root has been ascertained to be eaten in the course of the day by a beast of from seventy to eighty stone, besides hay or other dry fodder; and beasts, of from thirty to forty stone, consume not less than one hundred weight and three quarters. The usual quantity may be about eighteen stone in that space of time; and where much hay or other dry food is given, about twelve or fourteen; which large consumption renders such food expensive when used in this way. An acre of a good crop of this sort has been found, when consumed in the stalls, completely to fatten a beast of fifty score. But it has been calculated, that where the consumption is eighteen stone in the day, an acre will only serve about forty days; so that it would take three times that extent for the purpose, and render the expense equal to oil-cake, but which is certainly not the case. In stall-feeding with these roots, the beasts have in general only the bulbs or prime parts, the other being cut away; which is believed to be the reason of the beasts going on so well in their fattening in some cases. Wherever these roots are made use of in fattening cattle, much dry fodder is

constantly requisite, on account of their very juicy nature, as well as the large quantity in which they are consumed. Though they are a healthy and fattening sort of food, it is probable, from many trials, that they possess such properties in a less degree than any of the substances that have been already described; and, consequently, that they are an expensive sort of keep.

The largest of such roots only are used in some places, and they are always found to have a better effect after they have been taken up some time and dried than in their fresh state; as they are less liable to affect the bowels of the beasts. The practice of having them drawn three or four days before they are used is, therefore, very common, and considered beneficial in some districts. Beasts have sometimes been known to eat three bushels of these roots each in the day, and as much hay as if no other food had been given to them.

POTATOES.

The usual consumption of these roots, which have long been used for this purpose, is in the raw state from one to two bushels in the day, so as gradually to increase the proportions of them, for each beast in that time, with about ten or twelve pounds of hay. Some persons, however, have stated it to be ten or twelve stone in the same time, which makes it a dear food in this practice. In the former of these proportions, it requires from two to three months to finish a beast, which consumes from one hundred to a hundred and twenty bushels of the roots, and sometimes much more, with a large quantity of hay. A beast, of one hundred and forty stone, consumed rather more than a bushel in the day, with ten pounds of hay. Oxen have been fed with this root, at the rate of four gallons each, daily, one of which is given four times in the day at equal distances, beginning early in the morning. With some persons the usual allowance is, however, only three gallons. In some particular situations, from one to two bushels of these roots are given, in the raw, unwashed, and uncut state, except the very large ones; it being found that an ox of one hundred and sixty stone, eats considerably more than a bushel and a half, but consumes little hay, which is a saving, as, under such circumstances, this root is supposed a cheaper food than hay. A bushel of this root is sometimes set against a quarter of a hundred weight of hay. Small beasts of the runt kind have been found, in different trials, to consume in the proportion of about a bushel in the day each, with more than a stone of hay or other dry fodder.

It has been stated, on the authority of much practice and correct observation in this way, that in general one hundred bushels of this root and seven hundred weight of hay are sufficient for fattening a tolerably thrifty bullock; and that in using the roots, they should, in the beginning, be given in but small proportions, being afterwards increased in a gradual manner to the full quantities of a bushel or two in the day; dry fodder being constantly intermixed with them, the proportions of which, whether hay or other matters, must invariably be regulated by the effects which the roots have upon the bowels of the animals. The servings of the beasts with this intention should never be less than *four* or *five* in number each day, as the larger the quantity of the root that they can be induced to eat with appetite, the sooner they will be fattened, and, consequently, the expense be proportionably less, and the profit more. If the dry fodder be hay, it should be cut once, or if not very weighty, twice longways, and three times across the truss, so as that it may be in squares of eight or ten inch

portions, in which state it will be chewed and eaten better and more readily, and the fattening of the beasts be thereby much expedited. Though the potatoes need not be cut, except just at first for the purpose of enticing the beasts to eat them, they should always be *fresh* and *clean*. Nor is corn or meal absolutely necessary with these roots, but when they can be had at a reasonable rate, they may be made use of with much benefit. If when given in the raw state these roots are found to affect the bowels of the cattle too much, the quantities of the dry fodder or other substances, whatever they may be, should in such cases be greatly increased, until the beasts get used to them, when such effects will usually cease. It results, therefore, that in using this sort of food raw, some sort of dry fodder or material is indispensably necessary with a view to correct its purgative action; and even when given in the boiled or prepared state, such matters have also a good effect in affording suitable distention and fullness to the stomachs of the beasts.

Though these roots are in general disagreeable to cattle for the first two or three days, they soon acquire a relish for them. Some persons have supposed that these roots might be more beneficial if artificially sprouted; it is not, however, likely that their effects would be improved by such means, as in their naturally sprouted state their nutritious properties are apparently impaired.

In fact, although these roots have long been believed to be of much use in fattening and keeping cattle, the great merits of them in such cases have lately become doubtful, and when put in comparison with some other articles of food for such purposes, further trials have shown them to be neither so healthy nor so good a sort of food for such stock. See *Cow-keeping*.

Calculating them at the rate of two bushels in the day, an acre of this root will keep a beast of the medium size about one hundred and ninety days, with suitable dry fodder; and the produce in good crops of the root is generally about eight or ten tons.

GREEN WINTER CROPS.

There are many hardy green winter vegetables or plants that might be cultivated and grown as crops for this use, perhaps, with profit and success on proper soils, as the produce on the acre of several of them is very considerable. This might be the case with the different borecoles and various other similar plants. The daily consumption of such crops by the beasts would probably be more than ten or twelve stone each, but a less proportion of dry fodder would be required to be eaten along with them, and there would be scarcely any preparation of the food necessary. As their fattening qualities are less than any of those articles which have been already noticed, they are perhaps best suited to the smaller sorts of beasts.

WASH OF DISTILLERIES.

This is a liquid substance which has lately been applied to this use with much profit and success. It contains the remains of the malted grain which has been employed in distillation. The consumption of it by the beasts is not limited, but each has as much as it will take. It is, however, best to begin with small quantities at first, and to increase them by degrees, until as much be consumed as can be taken without disgust by the animals. It should be given three times a day, or oftener, and between each of such servings good hay or straw, which, if cut, should not be in too short a manner, should be supplied in pretty full proportions, in order to produce sufficient distention of their stomachs and cause them to chew

the food more perfectly. With these matters, brewers' grains are also sometimes largely given. But where the supplies of dry fodder are large, they will be less necessary. When the beasts are nice in taking this sort of food, it is a good practice, when the wash is brought from the distilleries, to discharge it from the carts into vats, or other proper vessels, and when they are about two thirds full, to have a suitable quantity of sweet hay cut as above directed put into the vats for a few days, that the liquor may be well impregnated with its smell and flavour. Thus prepared, the wash is taken to the feeding stalls, as wanted, and poured into troughs, or other contrivances, from which the cattle eat it; and if the steeped hay be used along with it, the food must be more beneficial to the beasts than the mere wash itself.

As in some few cases the beasts cannot overcome their aversion to this food for some days so as to eat it with an appetite, it has been advised to have the hay which is put before them frequently sprinkled over with the wash, so that by smelling it so continually and seeing it so much eaten by other beasts, they may be induced to taste it, and gradually get fond of it. This is, therefore, a good and very useful manner of beginning with such food in this fattening process.

This sort of wash has been very extensively made use of in this practice of fattening bullocks, in a large distillery in the vicinity of the metropolis, where several hundreds are annually thus fed with it during the winter season while it is regularly worked. There is no fixed length of time allowed for the fattening of such beasts in this way, which is regulated by the state of the markets; from ten to sixteen weeks is, however, about the usual space of time, in which the animals are found to gain much increase in weight of flesh and fat, as will be seen below. It is asserted that cattle, fed in this manner, not only pay well for the expense of their keep by fattening expeditiously, but afford a large quantity of excellent manure. Consequently, whenever such wash can be had in quantity, it should never be neglected in this intention of feeding, especially as it will most probably be found much more beneficial in such fattening, when used in the mixed state with a sufficient quantity of long chopped good hay.

MALTED GRAIN AND PULSE.

The malting of different substances of these kinds, by rendering them more sweet and agreeable to the stomachs of animals, is believed to cause them to be more nutritious and proper for the fattening of cattle. In this state both beans, barley, and oats, have been used in their simple form and in mixture with each other, and with different other materials in use for this purpose, such as chaff, potatoes, and some others. The consumption of such sorts of food, in the course of the day, for a middle-sized beast, is commonly a peck and upwards, whether given alone or mixed together; and when mixed with other sorts of matters from half a peck to a peck and upwards. But the proper method is to begin with them in such small quantities as not to heat the animals too much, and afterwards to increase them to the full extent in which they can be eaten with benefit in promoting the fattening of the beasts. Full supplies of hay or other dry distending kinds of fodder are, however, constantly necessary to be given with such materials, in order to produce the most complete effects in this mode of feeding cattle. In the malted state one bushel of barley was found, in actual trials, to go farther in this way than double the quan-

tity of oats when unmalted, so that malting is considered very beneficial in this case.

COARSE SUGAR.

Though this substance has yet been but little tried in stall feeding neat cattle, yet from the nature of its constituent properties, and from its having been found useful in promoting the condition and fattening of other animals, its utility in this way, in combination with other suitable sorts of food, can hardly be doubted, where the price will allow of its being fully and properly made use of. It may be given in the proportion of from one to two pounds and upwards in the day, in mixture with any sort of branny or coarse mealy matters; but perhaps a better method is to have it dissolved in some fluid, in which long-cut hay or strawy substances might be steeped, so as to become fully impregnated with it, as in such a state it would be consumed to the most advantage in fattening the beasts. This may be readily done in any suitable vessel, or other contrivance for the purpose, from which the feeding cattle might be easily and conveniently fed.

MOLASSES OR TREACLE.

This is an article of a similar kind, which has been used in this intention with success in the West Indies, and found to be beneficial in the fattening of cattle in general, but especially old worn-out oxen; but to effect this it must be used in combination with mealy matters; or where they cannot be had, with dry cane-tops, linseed cake, or other such substances, with a little hay or such fodder as is not too much in the green state. Such beasts as were starving and had been reduced by much severe labour for a length of time, were very highly benefited by it, and much expedited in their fattening. The consumption of this material is from half a pint to a pint twice in the day. In giving it, the method is to form balls to the weight of about a pound each, of coarsely ground grain, or potatoes in the quantity of a gallon, by boiling such substances with a little salt into a thick consistence, and keeping them constantly well stirred during the time: these balls are then to be divided into two equal parts, and after being for some time well soaked in the treacle, may be given to the beasts in the morning and evening, who devour them with greediness. With these balls and a little hay the cattle fatten rapidly. It is probably, however, a better as well as a less wasteful manner to have the molasses at once mixed up with such coarse mealy matters in the proper proportions for the beasts for the whole day, and to give it them three times in the day instead of twice; which is better for the cattle, and will render them fat more expeditiously. This substance has been given to other animals, and produced in them a fine coat and general good condition. Its price must, however, always regulate its use and consumption in this way. It has been found to feed out or finish the fattening of beasts very rapidly when combined with other suitable substances.

BREWERS' GRAINS.

These are sometimes made use of in fattening neat cattle where they can be had fresh and in sufficient quantity. A middle-sized beast mostly consumes in the day in the proportion of from a bushel to a bushel and a half or more of this food, with hay or other dry fodder in due quantity. They are commonly given in equal proportions three times in the day, and the dry fodder in the intervals of such feeds. It seems probable that grains might be given in mixture with long-cut soft good hay with much advantage in this mode of feed-

ing; and might save some labour, and perhaps food, and be less cloying to the animals. A good proportion for this purpose would be about half a bushel of such cut hay to a bushel or more of the grains. In this way the grains are eaten more perfectly and the effect of course is greater.

As, however, the nutritious properties of grains are so thoroughly drawn off from them in the process of making liquor, they are of course far less fattening than many other substances used in this way; yet, combined with good hay in proper quantity, they may serve the purpose in many instances where they can be procured with convenience.

DIFFERENT SORTS OF FLOUR AND MEAL OF GRAIN AND PULSE.

A great variety of these kinds of matters are employed with much effect in promoting the fattening of cattle, such as the flours of beans and peas, the meals of rye barley and oats, and of other sorts of corn, as the Indian. The daily consumption of the two first of these articles is about half a peck of either, beginning with rather less to avoid their too heating effects. In the other sorts it is generally about a peck in the day, beginning with smaller quantities in each of them. With all these substances it is constantly necessary for beneficial purposes to combine with them rather large proportions of dry foddery matters, and frequently also those of the juicy kinds. The flour or meal of peas and beans answer well for this purpose when mixed with sufficient quantities of bran. Though these articles are found very useful in this way, they cannot be employed with much profit on account of their high price.

LINSEED AND ITS PRODUCTS.

This substance is found greatly useful for this purpose in several of its different forms, as in its bruised or reduced coarse powdery state, in that of jelly, in the condition of cake, and in its oily form. In the rough powdery state of the seed, three pints in the day may be given at first, and the quantity increased as there may be occasion. It may then be served to the beasts in mixture with a sufficient quantity of wheaten bran or coarse pollard three times in the day, a sufficiency of dry fodder being supplied to them in the intervals. In this manner it will most probably be found highly beneficial in the fattening process, and at the same time it is cheap and very convenient. Mixed in the proportion of two pecks, with two and a half bushels of barley, and ground together, it is found to fatten well and be very useful in this mode of feeding: wheat, chaff, and hay, should be given at the same time with it. Each beast consumes in the proportion of rather more than a peck of this mixture in the day, or about two bushels in the week. Large beasts have been very readily and conveniently fattened in this way and with a great increase of weight in a short time.

In making it into a jelly for this use, a quart or three pints of the bruised seed should be put to six or seven quarts of cold water, which should stand for about twenty-four hours, then be slowly boiled for about two hours, keeping it well stirred occasionally; and when cool, it becomes a jelly of the proper thickness. It is consumed by the beasts in the proportion of about one and a half to two quarts of the jelly from twice to three times in the day, in mixture with about a bushel of long-cut dry fodder. Sometimes the jelly, when boiled, is poured on and intimately mixed and united with good sweet hay, cut as above, in the quantity of about a bushel for each feed, the whole being well covered up while hot, by such cut ma-

terials placed on the top. In any of these ways with a small quantity of some of the mealy matters, or the cake in a powdered state, the cattle may be well fed out, as the jelly is seldom sufficient of itself for that purpose. In these methods of using the jelly it will be found to be much cheaper and perhaps but little inferior to the cake itself. In some cases the jelly may be more properly given in combination with bran or other such substances, as mixing better and more perfectly with them.

Where jelly is made use of, dry fodder will, in general, be required in rather a large quantity. There cannot be any doubt that such jelly is more agreeable than the cake to the beasts, and less liable to disgust them. It may likewise be less apt to give that taste to the meat which is so unpleasant in some cases.

In the use of linseed cake, or the material left after pressing the oil from the seed, the daily consumption by large beasts is usually from about ten to twelve pounds. Some persons are in the practice of giving at first to an ox of one hundred stone weight two cakes in the day, of about six pounds each, for six or eight weeks, and then increasing them to three of the same weight, until the beasts are quite fed out. As the cattle, however, at first do not in general like this substance as food, it is a better method to begin with considerably smaller proportions of it, and gradually to increase it to the necessary quantity, as in that way much inconvenience and trouble will be avoided. The cake is mostly given in the broken-down state, either alone or in mixture with proper matters of the different fodder kinds in their cut state. With this substance so much dry fodder is not necessary, as with some others; yet some quantity of such bulky food is always proper for affording due distention to the stomach. From one to two stone of long-cut hay, or other such fodder, in the day, is generally sufficient for the purpose.

This sort of cake is also sometimes used in a kind of liquid form by being diffused in some warm fluid to be drank by the cattle, a due supply of hay or other such fodder, being given them at the same time. It is used also in some districts in small portions with much success to the cattle in the pastures, and may be employed usefully where the beasts fed with cake in the winter are not sufficiently fed out in the early spring season.

This is a substance of the food kind which has the property of fattening animals in a ready manner, but which is now become an article of considerable expense, and, consequently, can only be made use of with sufficient profit in certain circumstances of stall-feeding. It has been said to feed out or complete the fattening of beasts in a shorter portion of time than any other kind of food which has yet been tried.

The oil has been employed in this practice of feeding in combination with different substances. It was tried in America in mixture with the meal of Indian corn, but in consequence of too large a quantity of the oil being given by mistake, on one occasion, the beast became disgusted with it, and the trial failed. The steer fed with it was, however, remarked to thrive rapidly, and to sweat profusely with it.

In mixture with bran rather less than one third of a pint of the oil has been used by being well stirred into and blended with it for one feed, three such being given in the day, the quantity of the bran nearly that of a peck; good hay or cut fodder being given between the different servings in rather large quantities. This proportion was for beasts of the smaller-sized sorts.

It has been also beneficially used in com-

bination with good chopped hay, in the quantity of three bushels, by being sprinkled over it and then left to take on heat in the proportion of one quart, the whole of which was given in the course of the day in two or three servings, and increased with benefit to two quarts in the day, used in the same manner.

There does not, however, appear to be any peculiar advantage or convenience in feeding beasts with the oil, in these ways, in preference to jelly or cake, and the trouble is much the same.

OATS COARSELY GROUND OR IN THE STRAW.

This substance forms a very good article of food in this method of feeding, whether used in the reduced or strawey state; the consumption in the former state is usually about half a peck three times in the day, with cut fodder, and in the latter about the third part of a middling sheaf the same number of times in the day, with other fodder. But the last is the best manner of using it with a view of promoting the fattening of animals, as they eat it in that way the most perfectly. It is mostly, however, too expensive a sort of food to be used profitably in this way, as the weight of beef gained by it rarely pays; though it sometimes answers in feeding out such beasts as are three parts fat and not readily to be sold.

GOOD HAY.

This substance is but seldom used alone for this purpose, on account of the large quantity which is necessary; but is generally combined as an assistant with other materials, when it is given and eaten in different proportions according to circumstances, from half a bushel to a bushel or more in the day in the long cut state, which is the most successful method in this sort of fattening. A beast will, however, eat more than two stone in the day, and require nearly two tons for wholly fattening it. It is a food which affords good beef, and in some places may be a cheap and convenient sort of fodder for the complete fattening of cattle.

CHAFF AND STOVER.

These are dry matters which are in use as assistants in this sort of feeding, and of much utility and convenience in many cases, as serving to fill the beasts, and give them the necessary disposition to rest. They are given in the quantity of from half a bushel to a bushel and more in the day.

CUT BEAN AND PEA HAULM.

Materials of these waste kinds, when cut suitably long, answer well in the same way as the above, and may be given in nearly the same quantity in the day with any proper fattening substance. They are more lasting in the stomach than the above chaffy matters, but are perhaps less feeding in their nature.

CUT STRAW, OR CHAFF.

This, though simply a distending substance, is found very useful in many cases of stall-feeding, with other materials, in forwarding the fattening of animals. It is given in large quantities as above, with the best effects.

FOOD IN THE STATE OF ACIDITY.

Food in this state, has been recommended by some as highly beneficial in stall-feeding large beasts of the neat cattle kind, as having been found in other countries to fatten them well out, the finishing part of the process being completed by the use of rye-paste in a state of sourness, rendered liquid by means of water, and then made properly thick by suitable cut fodder. The necessary quantity is to be given three

times in the day, interposing proper proportions of bulky dry fodder. How far such a substance can be more useful in a state of acidity than in its natural one, is by no means evident or well ascertained.

NECESSARY ATTENTION IN, AND MANNER OF, FODDERING.

Long experience has fully and decidedly shown, that much nice and correct attention are indispensably necessary to many points and particulars in the feeding of animals in this, as well as other practices. It is, consequently, of very material importance, that strict attention be paid to ascertain that the beasts, whether kept in stalls tied up, or in open sheds untied, be foddered in a regular, steady, and exact manner. Thus, the proportions or quantities of food and fodder, which are given to them at each serving, should be equal at all times, and sufficient for the animals; and in so far as the nature of the business will allow, care should be taken that they have neither too much, so as to disgust them and cause waste, nor too little, so as to induce want and unthriftiness; and as fattening beasts are often very nice in their eating, and as they never do well after being in any way disgusted; at the same time that a full allowance is given them, it should not be abundant. They should never, so far as it can be known, have any thing they do not like put before them as food or fodder. The frequency of the fodderings should be partly regulated by the nature of the food, and partly by the states of the beasts, by the season, and other circumstances. With the drier sorts of food, two or three times in the day may be the most proper and beneficial; but with the more moist and bulky kinds, three and four times; it is, however, to be constantly had in mind, that the action of the system, in the fattening process, is always to be kept up and preserved in a high state, which can only be effected by the use of sufficient quantities of proper food given at suitable intervals of time. With this view, the different servings or fodderings should never be at too distant periods from each other, but be so regulated as to prevent any sort of sinking in the beasts from the want of fodder; and whatever periods are fixed upon, they should be observed as much as can be conveniently the case. It is material, too, that the several sorts of food should be as much changed and varied as the nature of the business will allow, in order that their good effects may be more powerful and lasting, as well as more beneficial in forwarding the fattening process. As fattening beasts which are not well attended to in these particulars, scarcely ever go on well or afford a proper profit; it is a matter of great consequence to engage persons who are well acquainted with the management, to undertake the direction of them, especially where the practice is carried on to any extent. The cattle in themselves, as well as in their stalls, feeding-mangers, and standings, should also be kept as clean and sweet as possible, by not letting them stand in, or have any sort of dirt or filth about them, the whole being well washed, swept, and cleaned out once in the day or oftener, if necessary. Dry clean litter should likewise be supplied in proper quantities, so as to have the standings well laid over with it, in order to prevent any kind of nasty matters sticking about their hides. Large proportions of such littering substances may be used in this way with great benefit in the way of manure in many cases. By these several means, every sort of offensive and disgusting smell may be effectually prevented. A proper degree of shelter and warmth, without too much heat, sc

as to excite too great a state of sweating, should be afforded as necessary in promoting the fattening process.

By an exact and careful regard to the several points and matters that have been noticed, and also to the giving them water in a proper manner, the beasts will be expedited in their fattening in a very great degree.

PROGRESS OR INCREASE IN FLESH.

The progress or increase in beasts in taking on flesh and fat, is very different according to different circumstances; such as the state of their dispositions for thriving, their differences in size and kind, the manner of their being fed, and the nature of the substances which are used for the purpose, as well as other causes. It is material in this practice, that the progress or increase in them be such as always to pay well for the food they consume. So far as trials on this point have yet been made, they seem to have decided, that large beasts, whether fed upon the same kind and quantity of food, and in the same proportion, are more profitable or have a greater proportionate increase in the weight of flesh and fat, than those of the smaller sort. For though few trials have hitherto been made to ascertain the weight of meat in proportion to the food consumed, it is the main point upon which almost every thing in this business depends. It is, indeed, the great criterion of excellence in it, as the greatest weight of flesh given by the least quantity of food is the only true test of merit in beasts; consequently, that sort of cattle which is found on trial to afford the fullest net money profit, from a certain determined amount of food, must, on the whole, be the most valuable. A beast that requires a third more or double the expense of another in food, to raise it to the same weight or give it the same quantity of flesh, is comparatively of little value. If beasts, which are capable of rising to the greatest weights, consume no more food in gaining such increase of flesh, than those which can only reach one-half or two-thirds of such increase of weights; or, if the same amount of expense in food that is required to increase small beasts to certain weights, will equally raise large ones to double such weights of flesh; the advantage of stall-feeding large beasts must be evident. That this is, in some measure the case, all the trials that have been made, have a tendency to show, as will be plain from what is stated below.

In order that such increase in flesh and fatness may be the most full and complete possible, every attention is necessary to the food, whatever its nature may be, to see that it is good of its kind, that it is given in sufficient quantity, and in a perfectly regular and varied manner, and that there is a proper degree of cleanness and sweetness, with a proper admission of air, in every thing about the beasts.

In a trial made with care in a southern district, under the direction of persons of much experience, with a view to the discovery of the progress and advantage in profit of large cattle in comparison with the smaller kinds, where the nature, quantity, and proportions of the food given to them are the same, several beasts of different sorts were put up for the purpose, to a mixture of linseed and barley-meal, namely,

Three Hereford oxen,
Two spayed heifers,
One Hereford cow,
Two Sussex cows.

They had each, for the first seven weeks, three gallons daily, of which one quarter was linseed, making three-fourths of a gallon; and for the other part of the time which they were in fattening, they had three gallons, of which one-third was linseed, apportioning to each

beast two gallons of barley, and one gallon of linseed, ground together, and mixed up with a proper quantity of wheat-chaff, in order to facilitate digestion and prevent the food sticking in their throats. Besides this food, they had hay in an equal proportion, weighed to them three times in each day, and a little more at night when shut up; which, in the whole of the twenty-four hours, amounted to thirteen pounds a day for each beast.

In the whole of the time, that these beasts were in fattening, it was particularly evident, that the large oxen throve and increased in weight much faster than the other part of the stock, and became at last very fat.

It is to be noticed, also, that of the eight beasts which were fed and kept in this manner, one of the oxen which was killed, weighed 170 stone, the other two which were sent to be sold, weighed 200 stone each; the two spayed heifers had the weight of from 90 to 100 stone each; the Hereford cow 105, and the two others 150 stone each. The two largest oxen made the greatest increase, and became the heaviest. The ox which was killed, increased more, and better on the same food than the cow. Each came from the same stock; but there was a difference of 65 stone, butchers' weight, besides the proportion of the fifth quarter, in favour of size, the ox, as seen above, weighing 170 stone, and the cow 105.

On this experiment it has been observed, by a very able judge, that the most perfectly-bred cattle of the Hereford sort, which have reached their full size, stand in need of a less proportion of food to fatten them than others of the same breed that are not so well and highly bred, or so handsomely formed: and that the amount of food consumed to produce this fat, so far from being greater, will be much less in proportion than in that with other smaller oxen of the same kind, which are not so highly bred; and greatly less than that of cows not of the same breed, which, when fat, have not more than half as much weight.

PROPORTIONS OF INCREASE.

The weight of eight beasts when put up to fatten, the weight in the fat state, and their different increases of weight in the time, are shewn below.

Names.	Put up November 27. *cwt. qrs. lbs.*	Weight, March 19, in next Year. *cwt. qrs. lbs.*	Increase in 16 Weeks. *cwt. qrs. lbs.*	
Duke	17 0 7	20 2 0	3 1 21	
Drummer	15 3 25	18 3 14	2 3 17	Hereford.
Merry	15 0 11	17 2 0	2 1 17	
Lock	14 1 21	17 0 0	2 2 7	
Spot	14 0 25	17 0 0	2 3 3	Sussex.
Lion	14 0 25	17 0 0	2 3 3	
Short	13 2 7	16 2 0	2 3 21	Devon
Foot	13 0 14	15 0 0	1 3 14	
	117 2 23	139 1 14	21 2 19	
		117 2 23		
		8)21 2 19		
		16)2 2 23		
		19 per week, live weight.		
		4d.		
		6 4d. per week, 10½d a day		

The beasts consumed in the above length of time, of the ground mixed food, in these proportions:

Linseed . .	11 quarters,
Barley . .	34 ditto,
Hay . . .	4 tons.

WORTH.

		l.	*s.*	*d.*
In the first at	27*s.*	45	18	0
—— second —	48*s.*	26	8	0
—— third —	4*l.*	16	0	0

It has been asserted, on the grounds of experience, by others, that a cow of the Sussex kind, of 80 or 100 stone, will eat as much as an ox of 140 stone, and that the quantity of food eaten is not by any means to be estimated in proportion to the weight of the beast, any more than the increase of them in fattening: and experience has satisfied many, that the difference in the quantity eaten, between small and large cattle, is in no way very materially at variance in any case.

PROPORTION OF INCREASE IN OTHER SORTS OF CATTLE.

It has been stated, in regard to trials with other sorts of cattle, that three two-and-a-half-year old oxen, of the improved short-horned Teeswater breed, weighing fifty stone each, were put to fattening on the 8th of December, from which time, until the beginning of the February following, they were fed upon the white globe turnip, consuming daily on the average seventeen stone four pounds; when from that time to the beginning of May, they consumed Swedish turnips in the quantity of eighteen stone on the average daily, at which time they were sold fat, weighing seventy stone each, having increased in weight at the rate of one stone in the week, for the twenty weeks.

In an heifer of the same breed, that had been kept in the usual manner of the common young stock from the end of April for the first year, and until she was two years old; when, in November, having the weight of twenty-eight stone, she was put to Swedish turnips, hay, and oil-cake, of which she ate four hundred weight, besides two bushels of bean and one of barley meal; she then went to grass on the first of the succeeding May, without having any more oil-cake, when, on the third of July, she had increased in weight to from fifty-eight to sixty stone, having gained at the rate of one stone and upwards for the thirty weeks.

In other trials of this nature, made with beasts of various kinds, weights, and sizes, from fifty-nine to one hundred and twenty-nine stone, fully fed with different substances of the meal and other sorts, as below, the increase was, on the average, for nine weeks, thirteen stone each beast, or nearly one stone and a half in the week for that time.

KINDS OF FOOD USED.

Bean-meal steeped,
Beans malted,
Barley malted,
Beans and barley malted,
Barley-meal steeped,
Barley-meal dry,
Bean-meal dry,
Turnips,
Potatoes,
Beans malted and chaff,
Barley malted and chaff,
Beans and potatoes malted,
Potatoes and beans malted.

The lowest degree of increase in the least-weighted beast, in these cases, was eight stone, and that of the highest nineteen and a half in the above length of time; and the several intermediate increases of weight were from eleven to fifteen stone in the same time.

Sorts of beasts.	With other kinds of food.	Length of time.	Increase in each head. St.	lbs.
Short-horn and Irish	Tares	4 weeks	3	3
	Cabbages and hay	8 ——	4	7
	Potatoes, hay, and malted beans	11 ——	8	7
	Beet-root	6 ——	5	5
	Potatoes	6 ——	6	12
Kiloe Scots	Tares	12 ——	8	7
Home Sorts	Tares	12 ——	8	7
Runts	Potatoes, beans, hay, and chaff	15 ——	6	8

In these sorts of beasts the increase was from half a stone to a stone and a pound or two each, in the week, the cattle having a full supply of such kinds of food.

LIVE AND DEAD WEIGHT.

The greatness in the dead weights or those of increase to those of the living weights of beasts, is in some measure a proof of their goodness. These stand somewhat in this manner in different-sized oxen.

In a large ox, three years and a half old, of the improved Durham or Teeswater breed, they were these,

	St.	lbs.	St.	lbs.
Live weight			137	12½
Blood		3 13		
Head and tongue		3 6		
Heart, liver and lungs		4 1		
Feet		2 1		
Stomach and entrails		8 11		
		22 4		
Hide	8 0			
Tallow	11 7		19 7	
Total offal parts			41 11	
Carcase			96	1½

Proportion of the dead to the live weight more than ⅔ by upwards of four stone.

In a smaller ox, of the same age and kind, they were,

	St.	lbs.	St.	lbs.
Live weight			125	5
Blood		2 10		
Head and tongue		3 4		
Heart, liver, and lungs		3 9		
Feet		2 0		
Stomach and entrails		13 9		
		25 4		
Hide	7 11			
Tallow	7 13		15 10	
Total offal parts			41	0
Carcase			84	5

Proportion of the dead to the living weight about ⅔.

In an ox of the Devonshire kind, upwards of three years' old, they were,

	St.	lbs.	St.	lbs.
Live weight			114	0
Entrails and blood		11 13		
Head and tongue		2 9		
Heart, liver, and lungs		2 7		
Feet		1 4		
		18 5		
Tallow	10 6			
Hide	6 3		16 9	
Total offal parts			35	0
Carcase			79	0

Proportion of the dead to the live weight more by three stone than ⅔.

PROPORTIONS OF BONE TO MEAT.

It would seem, from the few trials which have been hitherto made in respect to the proportion of *bone* to *meat*, in large and small beasts, that in those of the former kind, which have been well fed, and which have the weight of from 190 to upwards of 200 stone, it may be rated at about one fourteenth part of the whole carcase; and that in the latter, when in a moderate state of fatness, and of the weight of from about 40 to 100 stone, it may be in the ratio of about one-eighth part of the whole carcase weight.

It may, therefore, be concluded, that there is on the average somewhat from about two and

a half to three ounces of bone to each pound of meat; and that by taking three divisions of the loin part, which are said to have been found to be each equal to the other in the proportions of bone to meat, the weight of it in the whole carcase may be in some degree nearly ascertained.

BENEFITS OF THE PRACTICE.

The principal objects in this system of cattle management are those of the profits arising directly from the fattening of the beasts, and the more remote advantage which is produced by the great quantity of excellent manure which is raised in the process. The benefits in both ways are considerable, in cases where the business is well conducted and attended to: as in the former, where the beasts are capable of being bought in conveniently, in proper states, as they may be wanted, whether for wholly fattening or only feeding out, there are few modes of practice with animals that pay better; and in the latter, the stores of manure that may be raised, afford a profit, convenience, and utility, that are scarcely to be calculated, as each load of hay, or other fodder, provender of different sorts, and litter, will increase, in this way, to an almost inconceivable extent, and be of the best quality for field use.

SECTION XIX.—*Diseases of Neat Cattle, and the means of curing them.*

THE disorders and complaints to which cows are particularly liable at the time of calving, having been already noticed; the general diseases and accidents of all sorts of neat cattle-stock may be considered and explained as to their nature, and the various methods of cure, under the present head.

All sorts of neat cattle are subject and liable to many diseases and affections, which attack them in different manners, and in several different parts of their bodies; but such cattle as are the most exposed to severe cold, and to the frequent change of climate, as well as those employed in labour, are by far the most disposed to disease. Those which are strong and in high keep and condition, are generally the most disposed to the sthenic or inflammatory kind; and those of less strength and condition to the atonic sort, or those of weakness: the several different causes and appearances of which will be seen below.

SIMPLE CATARRHAL FEVER, INFLUENZA, DISTEMPER, OR THE EFFECTS OF COLD AND EXPOSURE.

Neat cattle, from the nature of their exposure, are much liable to diseases of this kind; but such as are suddenly removed from cold, damp, exposed situations, to those which are mild and warm, or which are suffered to cool quickly after great exertion or exercise, and which are much exposed to blasts of cold moist air, heavy dews, and the changing state of the weather, are the most apt to be affected with complaints of this nature. They are, in some instances, quite mild and gentle in their kind, readily passing away of their own accord in a little time, or simply by the use of mashes made with scalded bran, ground malt, grains, oat-dust, and other similar substances; or by mixing a little barley-meal with warm water, and letting them have it frequently as a drink. But in other cases of more rapidity and violence, in the commencement, they require to be restrained and kept down from the time of their attack by the use of suitable remedies. In some instances, indeed, such fevers rise to a very great height, so as to be attended with no inconsiderable danger. They should, therefore, in all cases, be well attended to at first, as otherwise, they often reduce the condition of the animals, and lay the founda-

tion of many complaints in the lungs and other parts, which may be prevented by suitable means at early periods of the disease.

In the more severe and violent cases of this sort, there is commonly the appearance of much restlessness and uneasiness about the animals, with great heaviness in the head, dulness of motion, and disinclination for eating or a loathing of their food, a wateriness and somewhat closed state of the eyes. These symptoms are generally attended with a sort of cough or hoose, and the signs of stiffness and soreness in the glandular parts near the mouth, throat, or neck, and a quickness and difficulty in the breathing, with considerable heat, constriction, and dryness in the skin and other parts. Sometimes, also, glandular swellings about the ears, difficulty in swallowing, and a discharge from the nose follow. The beatings of the arteries are constantly more or less full and quick, in proportion as the fever is more or less strong or high, but always much more accelerated than in the natural state. The animals have an uncommon appearance of coldness behind their ears, in their extremities, and other parts of their bodies. There is frequently much shivering or trembling, and the coats or hides have the hair standing in a very rough staring manner upon them. The urine is mostly high coloured, though sometimes pale, and there is in some cases much constipation of the bowels, especially at the commencement of the disease. The secretions of milk, or other kinds, are in some cases suddenly reduced or wholly suppressed in these complaints, and there are sorenesses or tendernesses in particular parts on being forcibly pressed or touched with the hand.

Where the disease has many of these appearances, and is greatly prevalent in any situation, it is mostly termed *influenza* or *distemper*, which seems to differ little, except in being supposed contagious, but which is probably not the case, as no satisfactory proof of it has been given. It is a state of the disease, which, however, soon becomes attended with considerable weakness and debility, as will be seen hereafter.

In the removal or cure of complaints of this nature, where they are of a mild kind, nothing more will be necessary, in most cases, than merely opening the bowels, where they are in a constipated state, by the use of such remedies as below, and giving such mashes as have been suggested above, in a free and frequent manner afterwards.

Take of—Submuriate of mercury, or,
Calomel, one drachm and a half,
Sulphate of potass, or,
Vitriolated tartar six drachms,
Root of rhubarb, in fine powder, half an ounce;
mix and make them into a powder;—which may be given in a little warm gruel; or,

Take of—Sulphate of magnesia, or
Epsom salt, ten ounces; dissolve it in three pints of thin gruel,
Ginger, in powder, one ounce,
Syrup of buckthorn, two ounces;
mix them. This solution is sufficient for one dose.

Either of these opening medicines may be immediately given to the animals; but when the latter is had recourse to, it should be given while a little warm.

Where the cases are very mild, smaller doses of these opening or purging medicines may sometimes be sufficient.

But in cases where they are of the more severe and violent kind, it will frequently be necessary and useful in the first place, where the beasts are not too weak and low in condition to lessen the force and action of the circulating vessels, by drawing away a little blood from some of the larger veins, but not in too large a proportion; and the sooner this is done the

more beneficial it commonly proves, but should seldom or ever be had recourse to when the disease has existed some time. When this has been performed, great benefit may be procured in lessening the heat, constriction, and dryness of the skin by giving the following powder;

Take of—Antimonial powder, four scruples,
Submuriate of mercury, or,
Calomel, one drachm and a half,
Nitrate of potass, or,
Common nitre, in powder, one ounce,
Ginger, in powder, two ounces;
mix and make them into a powder.

The use of this powder, and the evacuatory means advised above, when there is costiveness, will, however, in many cases, be quite sufficient for the removal of the diseases without bleeding; and where there is much looseness, it must be restrained by the addition of a little opium to the powder.

The powder may be given very conveniently in about a quart of warm gruel or any other similar liquid, according to the size of the beast, and be continued as there may be a necessity for it.

The bowels should at the time, and after the use of this powder, when necessary, be well opened, and kept in that state; and any offending matters should be removed by means of such purging remedies as have been described above, and recourse be frequently had to the mashes, lickings, and drinks already noticed.

Where there is much difficulty of swallowing, the use of an embrocating liniment of this kind, frequently well rubbed on the throat, may be found useful.

Take of—Common oil, two ounces,
Oil of turpentine, one ounce,
Solution of subcarbonate of ammonia, or,
Spirit of salis ammoniaci, six drachms,
Tincture of opium, half an ounce;
mix them well together.

By these means, fevers of this kind are often speedily removed.

In cases of these sorts, where, after the fever is removed, there remains a dry husky cough or hoosing, much advantage will frequently arise from the free use of warm steaming mixtures; and mashes eaten out of narrow tubs or troughs, to which may occasionally be added the following mucilaginous drink:

Take of—Liquorice root, cut and sliced,
Linseed, bruised, each five ounces; boil them in two quarts of water for a short time, and then strain off the liquor; to which, when nearly cold, add,
Common spirit, four ounces,
Tincture of opium, two drachms,
Dissolved coarse sugar, two ounces.

A large hornful of this drink may be given once or twice a day, until the hoosing or huskiness disappears.

The cattle at this time, if there be plenty of grass, should be turned into good dry pastures, if of the salt marsh kind, so much the better, as they are particularly advantageous in restoring and bringing them into condition after such diseases.

These remedies, during the summer season, may be given to the cattle in the pastures, care being taken that they are confined in a shed or some other place for a short time after taking them, and also in the nights and wet weather; but it is always better, when convenient, to confine them to the house in large open buildings, where there is a free air.

There are several cases of these sorts of disease where the fever does not rise or run high, but in which the cattle are considerably affected in various ways. In some the beasts are extremely low and weak, being suddenly seized with great coldness and trembling, and are easily overcome by any slight exertion. There are marks of great lassitude and weariness,

with a small quick weak state of the pulsations in the arteries. The animals either wholly reject their food or take it in very sparing quantities, and with great difficulty and reluctance; by which means they soon fall away in condition, and become in a thin emaciated state, which is highly prejudicial, and not to be easily removed.

In cases of this nature, after the feverish appearances have been removed by the use of small doses of antimonial powder, calomel, and hard opium in powder, given in gruel of the oatmeal or other kinds, the body may be strengthened and supported, and the restoration of the animals be effected by such means as these:—

Take of—Oak bark, in powder, four ounces,
Root of gentian, in powder, two ounces,
Snake root, in powder, one ounce; mix them well together for one dose.

This may be given in about a pint and a half of warm ale, or gruel, to which add about half a pint of common spirit, every day or every second or third day, as there may be occasion.

The beasts should at the same time have good hay, bran, coarse ground oats, and such like substances, given them as food, with warm water for drink where there is a necessity for it.

In cases where, besides the appearances of severe colds, there is much rejection of food, in addition to the use of the antimonial fever powder, as above, the effect which is desired may be kept up with great advantage by the following powder, given in warm gruel, with a suitable quantity of treacle; that is, from about half a pint to a quart of the gruel, once in the course of the day, or oftener, as there may be occasion; by which means the appetite will be much improved.

Take of—Oxide of antimony, one ounce and a half,
Tartarized antimony, or,
Emetic tartar, one scruple,
Ginger, in powder, three ounces; mix them well together, and make a powder.

In these cases, the beasts should be well sheltered from the effects of wet, and be well supplied with mashes and lickings, as well as have warm water for drink when necessary.

Cases of this nature frequently occur in cows and other cattle from hard and long driving, and from being much harassed and exposed on the roads or other places.

In these cases where from the effects of cold there is a sudden loss of the secretion of milk in cows, attended with much fulness in the blood vessels and considerable fever, it will sometimes be necessary to take away a little blood before the above powder be had recourse to, as its effect is thereby much promoted.

The common influenzas or distempers which occasionally prevail so much, and to which neat cattle are so subject, are of the cold or catarrhal kind, as seen already, and frequently proceed simply from a sudden changeable state of the atmosphere, as from a warm moist condition of it to that of a sharp dry piercing cold one; and also from the prevalence of such winds as blow from cold quarters during the winter or early spring months, as well as from other similar causes, as noticed above.

They are mostly removed in a ready manner by such means as the above; and sometimes, when the fever has abated, merely by having recourse to warm cordial drinks, composed of different sorts of seeds and roots in a fresh pounded state, such as anise and caraway seeds, pepper, and ginger. But none of these, nor any other hot stimulating kinds of matters are proper in any of these cases until the fever has been removed; though they are too often given in the

forms of powders and drinks in such states of the disease.

It will be necessary in all these cases, for several days after the disorder is removed, to examine the beasts daily to see that they are in proper heart and state of body, pass their dung and urine freely, and that they are not in any way affected in their breathing, as well as that they take kindly to their natural food again.

In all states these diseases are constantly to be counteracted, prevented, and guarded against as much as possible, as their consequences are often very hurtful to cattle.

INFECTIOUS PESTILENTIAL FEVER, OR MURRAIN.

This is a sort of fever that occasionally attacks neat cattle, and which mostly proves fatal to them. It has formerly made great ravages among this kind of live stock, not only in this country, but in most parts of the continent, and may again prevail. It was particularly destructive to the cattle of this country about the middle of the last century.

It seems to have varied greatly in its nature, appearances, and degrees of virulence, according to the circumstances and differences of the states and habits of the animals. The strongest beasts and those most in condition are said to have been in general the most liable to the disease; but no state of the animals exempted them from its attacks. It would evidently appear to have been of a highly infectious nature, and was probably the effect of some virulent or strongly contagious matter conveyed by the surrounding air or atmosphere. Some have indeed supposed it to have had much analogy to the plague or yellow fever of tropical climates, which is so destructive to mankind.

On the supposition of the cause of the disease being conveyed by and received from the surrounding air, which is probably rendered much more active and infectious by the breathing and exhalations of the diseased animals, much advantage might be gained by dividing and separating all such diseased animals as soon as they are affected, from those which are in a perfectly sound state, as by such means the progress and spreading of the infection would be greatly checked and prevented. And the sooner this was done after any appearance of the disease, the more effectual it would be.

This fever is said to be first shewn by the whole of the animal's frame becoming at once disordered and deranged for some days, before any other appearances take place. There is then a violent shivering and trembling in the limbs with marks of coldness; the head and neck seem much affected; there is a difficulty in swallowing; the eyes appear heavy, dull, and languid, with a moisture or wateriness in them, tears seeming sometimes to stand in them; the appetite is gone, and there is generally a continual scouring from the bowels: the fever, which at first is often high and strong, frequently runs quickly into a putrid state, and much weakness ensues.

After some days, the head, horns, and breath feel very hot, while the body and limbs are cold; the mouth, in some cases, is affected with blisters; and the breath and dung of the beasts become in a fetid and offensive state. These and the exhalations from their bodies often contaminate and infect the surrounding air to some distance, which occasions great danger to other beasts.

In consequence of the violence of the fever, the stomach and bowels frequently become quickly affected, and tumours or swellings are sometimes formed in the loins or in some other parts of the body. The air, in some instances

of this kind, is from the debility, relaxation, and destruction of the parts, thrown out into the cellular or adipose membrane, and affords a crackling rustling noise, somewhat similar to that of a dry full-blown bladder when pressed upon by the hand.

This state of the disease very frequently terminates in gangrene or mortification, leaving but little chance of the recovery of the animals.

In the cure of the disease, it has been advised to have recourse, in the first place, to full bleeding once, or oftener, as there may be occasion; taking away very large quantities of blood at a time. But such very copious bleedings seem evidently improper, and often have been hurtful from the nature and tendency of the disorder being so directly and rapidly in many cases, to the state of putridity and great weakness. Whenever bleeding is at all necessary in such cases, it should, consequently, never be practised, except in the very onset of the disease, and then only in a rather small degree in proportion to the size, strength, and state of the beast.

Such means as the following, might, perhaps, frequently be found useful in removing the disease after a proper bleeding on the first attack, where the beast is in high condition:

Take of—Antimonial powder, one drachm and a half,
Camphor, reduced into a fine powder, two drachms and a half,
Hard opium, in fine powder, half a scruple,
Nitrate of potass, in powder, six drachms; mix and form them into a powder, which may be given in a pint and a half of warm oatmeal gruel, twice in the day for several days after the first appearance of the complaint, until the fever begins to give way; when once a day for some days longer will be sufficient.

At the same time, the bowels should at first be kept well open and in a rather loose state, where there is not the usual scouring, by the use of the purging solution recommended in the cases of fever from colds; or a powder, composed of such ingredients as the following, might answer better in some instances:

Take of—Tartrate of potass, or,
Soluble tartar, one ounce and a half,
Root of rhubarb, in powder, half an ounce,
Ginger, in powder, one ounce;
mix and make them into a powder, which should be given in a large hornful of oatmeal gruel, as there may be occasion.

By the use of these remedies, fevers of this kind might often be removed in the course of a few days; but where they are so obstinate as not to be checked by such means, but continue to increase gradually, and to bring on great weakness and putrefaction, it then would become necessary to administer such medicines as the following:

Take of—Oak bark, in powder, two ounces and a half,
Cinchona, or,
Peruvian bark, in powder, two ounces,
Alum, in powder, three ounces,
Hard opium, in powder, two drachms; mix them well together, and make them into a powder.

This powder should be given in a hornful of warm ale two or three times a day in bad cases, and less frequently where the danger is not so great, until the putrid tendency begins to give way, and is in some measure removed; when the beast should be well supported and kept up by good nourishing food, and the frequent use of mashes made with grain or malt.

A hornful of good vinegar, or about a pint, with two or three drachms of the tincture of opium, might also be given a few hours after the powder, with very great benefit, as a means of stopping the progress of the putrid tendency.

The following drink might sometimes supply the place of the powder with great effect and advantage, as being of a more quick and powerful nature in its operation:

Take of—Subcarbonate of ammonia, two drachms and a half, dissolve it in four ounces of the decoction of
Oak bark made strong,

Spirit of camphor, two ounces,
Tincture of opium, three drachms; mix and make them into a drink.

This might be given in a quart of strong decoction of common oak bark, which is made by boiling a sufficient quantity of the coarsely pounded bark of the above kind, for a small length of time in rain-water, putting five or six ounces in three pints of the water boiled down to a quart, or thereabouts, and then straining off the liquor through a coarse cloth.

In fevers of this kind, it would seem always favourable that their progress should be checked and impeded in the early stages of their attacks, as it has been remarked, that when that is the case, the beasts commonly recover. They are often, however, left in an extremely low, weak, and feeble state of body. In these cases, such drinks as the following might become very useful:

Take of—Oak bark, well powdered, three ounces,
Gentian root, in powder, two ounces,
Subcarbonate, or,
Rust of iron, rubbed well into powder, one ounce,
Ginger root, in powder, one ounce and a half; mix them well together into a powder, which should be put into a quart of warm oatmeal gruel, with half a gill of some common spirit, or a few table spoonfuls of rum or brandy, and a little coarse sugar, and be given as a drink every two or three days, for a week or longer, according to the necessity of the case.

The salt of steel might, in some instances, be beneficially substituted for the rust of iron, in the quantity of six drachms, half an ounce, or less, as there may be occasion.

A drink, composed in the following manner, might sometimes be found still more useful, and may have a better effect in restoring the beasts than the above:

Take of—Strong decoction of oak bark, three pints,
Tincture of cinchona or Peruvian bark and
Compound tincture of cinnamon, each one ounce,
Diluted sulphuric acid, or
Elixir of vitriol, two or three drachms,
Treacle, two ounces; mix them and use them as a drink; to be given occasionally as the state of the animals require.

It is by no means unfrequently the case, that tumours and swellings take place in different parts of the body, soon after the commencement of the disease, which when they fill properly, and form good matter, that is capable of being discharged in a suitable manner, they are mostly to be considered as favourable; but when they take on a mortifying state, and the inflammation in the part loses its redness, and becomes of a dusky copper or livid colour; the tension of the skin at the same time going off, and the latter having a flabby unnatural feel; and when the aspect of the tumour, swelling, or part, changes to a dark or blackish hue, the pulsations in the arteries becoming weak, quick, and low, and being attended with the breaking out of cold clammy sweats in different parts, it is evident gangrene has taken place, and that there is then little chance of the recovery of the animals.

On the first appearance of swellings of this nature, some persons are of opinion, that advantage may be derived from bathing the parts well with the following mixture, keeping them covered with cloths moistened with the same:

Take of—Camphor, six drachms, dissolve it in six ounces of
Proof spirit, then add of
Vinegar, one quart,
Tincture of opium, two ounces and a half,
Compound sope liniment, one ounce; mix them, to be used as a stimulant or discutient wash.

It may be used cold in the manner as above, and has been known to have stopped the putridity and tendency to blackness in these swellings.

When a favourable change takes place, which is shown by the tumour either wholly disappearing, or the swelled and tumefied parts proceeding in a gradual slow manner to a state of

suppuration; the above wash should be left off, and its place be supplied by the application of a bread or linseed poultice, which in general readily accomplishes the business. The use of oils and unguents are always to be avoided in these cases. When the matter is ready, it should be let out and discharged by means of a proper knife or lancet for the purpose, the part being afterwards dressed in a suitable manner.

Some persons advise the removal of the mortified parts, in such cases, by means of the knife, but the practice seems seldom to have answered any good purpose. It is perhaps better to let them slough away of their own accord, only dressing the parts at first in a suitable manner, with portions of lint, moistened with a mixture of the tinctures of myrrh, opium, and benzoin, or traumatic balsam.

In cases of this disease, the beasts are sometimes much afflicted with an inflamed state and soreness of the mouth, accompanied with blisters, or a sort of aphthous little swellings or specks, which are very troublesome to them, and prevent them from eating their food in a proper and sufficiently full manner. In these cases, considerable relief has occasionally been supposed to be afforded, by the use and application of the following wash to the whole of the inside of the mouth and throat, by dipping a piece of sponge or rag, which is securely attached to the end of a portion of cane or stick, about twenty inches in length, in the liquid, and working it about well in the mouth of the animal, as often as necessary. A portion of the mixture may also be thrown into the throat by the horn at different times, according as the beasts are affected.

Take of—Dried alum, in fine powder two ounces and a half,
Sub-borate of soda, or
Borax, in fine powder, six drachms, rub them well down with two ounces and a half of
Honey, then add gradually
Vinegar, one quart; mix them well together and let the liquid be kept for this use.

Where the beasts, in these cases, are not themselves capable of taking in a sufficient quantity of nourishment for their support, they should have a proper quantity of thick gruel made of oatmeal, or oatmeal and linseed-meal mixed, given them by the horn, as often as necessary. As soon as they begin to eat again, they should have mashes and lickings, made by scalding bran, ground malt, and other such substances, given them frequently. Due care and proper management should, of course, be bestowed on them, until they are restored to their former state and condition.

In the view of preventing and counteracting the spreading and effects of the contagion among the cattle, which remain sound, much advantage and security might arise from the practice of having them brought up and bled, and by giving them the aid of drinks. But how far such means have the power of putting a stop to the infection, has not been well ascertained, though some persons have great confidence in them. It is probably full as well, in many cases, to let the cattle remain in the pastures, without doing any thing, except being careful instantly to remove any beast that may be attacked from the rest of the herd.

In all cases of this nature, it would seem to be beneficial, to take away blood, in the first place, where the fever is strong, and the appearances of the disease indicate the necessity of it; and afterwards the means which are recommended above for wholly removing the complaint might be had recourse to, having proper regard to the state and strength of the beasts. But as there seems often to be, after some days, considerable depression of strength, with great loss of

appetite in the animals; when these take place, the beasts should be well supplied with strengthening remedies, as before advised, as well as with the proper sorts of nourishing food, and good dry pastures.

It is not improbable, but that many of these cases may be simply of a catarrhal nature, and be easily removed in the same manner.

INFLAMMATORY FEVER, WITH LOCAL AFFECTION OF PARTICULAR PARTS.

There is a class of diseases to which neat cattle are subject, but more especially cows, in which there is, for the most part, a strong fever of the inflammatory cast, accompanied with local inflammation of some particular part or organ of the body. These are cases of disease which most commonly arise from the effects of cold and exposure upon the general frame, and their particular local action on the part which is peculiarly affected, but they may also proceed from many other causes. They are usually marked by much uneasiness in the beasts, a want of feeding, a hurried state of the breathing, a stiffness and soreness in different parts, a dryness and constriction of the skin, great heat, strong beatings of the arteries, and coldness, with much shivering and trembling. They often attack suddenly, and with much violence, rising to great heights when not prevented.

They quickly reduce the animals from a state of great vigour and condition, to that of great exhaustion and weakness. The danger or risk in all these cases is, for the most part, in proportion to the strength of the fever, and the importance of the part or organ which is locally affected; and there is always a correspondent sort of management which is necessary for their removal.

INFLAMMATION OF THE BRAIN.

This is a disease to which the younger sorts of neat cattle are sometimes exposed, though much less commonly than is usually supposed. It most frequently seizes them on the approach of hot summer weather, though it may happen at any other season of the year. It is occasioned by a great variety of causes, but principally by the powerful and intense action of heat after much exposure to severe cold, by the suppression of the necessary natural evacuations of the animals, or by particular affections of the head and brain, which may be produced in various ways.

In some instances it arises from an original or primary disease in the substance or the coats of the brain themselves; in others it proceeds from fevers of different descriptions, or from inflammations of other parts of the body, which are suddenly transferred to the brain or its contiguous parts; sometimes the immediate cause is, too great an exertion or increased action of the vessels of the whole body, inducing high or strong fever, and more especially of some particularly affected part; and sometimes again it is brought on by contusions and wounds inflicted on the head.

The appearances which commonly accompany the approach and denote the presence of a true inflammatory state of the brain or neighbouring parts, are a constant restless watchfulness in the animals, which is attended with delirium and frequent ravings; a slow and disturbed state of the breathing in them; and a strong state of the pulsations in the arteries about the head and neck. The beasts seem in a very fierce state, and as if seized with a furious kind of distraction. Their eyes appear greatly inflamed, and ready to start from their sockets: they frequently fall down suddenly,

and rise again in an equally quick manner, by which means they become quite exhausted: there is a constant trembling and starting of the tendons taking place; a harsh dry state of the skin; a suppression of the urinary discharge; a continual grinding of the teeth, and a total want of rest and quietness. These last are always unfavourable appearances in these cases, but those of running at the nose are favourable.

In some cases there is great heaviness and sleepiness, with dimness, or loss of sight, and a less degree of fever and inflammation; while in others there is the appearance of a sort of swimming or giddiness, and a wavering and staggering motion in the animals, with much affection about the cavities of the eyes, and the fore parts of the head, when the disease approaches more to the nature of staggers.

In the cure of the fevers and inflammations and affections of this nature, much attention is constantly necessary to the state of the former, and the extent of the inflammatory appearance in or about the brain, on which it principally depends.

The violence of the fever and the local inflammation are to be lessened, in the first place, by taking blood away freely from the jugular, or other large veins about the head and neck, drawing it by means of a large opening, and repeating it as there may be occasion, and in proportion to the size, strength, and condition, of the animals. After which, the following purging drink may be given with great benefit in farther reducing the over excitement of the vessels of the particularly affected part or parts, as well as of the whole body:

Take of—Sulphate of soda, or,
Glauber's salt, eight ounces, dissolve it in three pints of hot infusiou of senna, and when nearly cold, add of,
Tartrate of potass, or
Soluble tartar, one ounce and a half,
Syrup of buckthorn two ounces; make them into a drink.

This is to be continued, as there may be occasion; and, at the same time, the powder which is directed below may be made use of in further promoting the advantages which are derived from the above means:

Take of—Tartarized antimony, one drachm,
Camphor, reduced into a fine powder, two drachms and a half,
Sulphate of potass, or,
Vitriolated tartar one ounce,
Snake-root, in powder, half an ounce: mix and make them into a powder, which may be given once or twice in the course of the day, according to the state of the beast, in a large hornful of warm gruel.

In some cases, the following powder is considered to be more powerful in the removal of the inflammatory appearances of the disease:

Take of—Antimonial powder, one drachm and a half,
Camphor, rubbed down into a fine powder, two drachms,
Nitrate of potass, in fine powder, one ounce and a half,
Contrayerva, in fine powder, half an ounce; mix and make them into a powder, which may be given in about a pint of linseed tea or gruel, night and morning, until the inflammation begins to give way; when once in the same length of time may be sufficient to complete the removal of the disease.

While the fever and inflammatory state of the parts particularly affected continue, all sorts of hot stimulating medicines or food should be carefully avoided; and such only employed as have a tendency to lessen the too great activity of the vascular system of the animals. They should, in general, be given in the cold state, or but very slightly warmed.

As the beasts are frequently left, after such attacks are removed, in a very weak and reduced state of condition, it may be necessary, in such instances, to have recourse to strengthening remedies of the following kind.

Take of—Common oak-bark, in powder, six ounces,
Cinchona, or,
Peruvian-bark, in powder, two ounces,
Gentian root, in powder, one ounce and a half,
Ginger-root, in powder, two ounces; mix and make them into a powder, which may be given several times, as there is occasion, in about a quart of oatmeal gruel, to which a little of some sort of spirit may be added.

The subcarbonate, or rust, of iron may also be added to the above powder, where the weak state of the animals may require it.

Inflammatory swellings sometimes take place in cases of this nature on the jaws, and about the external parts of the head, the former of which often occasion a great difficulty in swallowing by their pressure, from which the latter become gradually closed or locked as it were.

Where spasms and contractions of this kind take place in the muscles of the jaws, in such inflammations, powerful remedies become necessary for their removal. In cases that admit of any thing being thrown into the stomach, the following may be useful:

Take of—Camphor, two drachms, rub it well down in six drachms of
Rectified spirit, then add of
Tincture of opium, three drachms, and of
——— Castor, half an ounce; mix them, and give the whole in a little oatmeal gruel just warm.

Great advantage is likewise ascribed to the following application, used externally on the swelled parts:

Take of—Soft sope, four ounces, rub it well down in
Solution of subcarbonate of ammonia, or,
Spirits of hartshorn, six ounces, then add of
Oil of origanum, one ounce, of
Proof spirit, six ounces, and of
Tincture of opium, five ounces; mix and make them into a fine liniment or embrocation.

The affected parts are to be well rubbed with it twice a day, or oftener if necessary.

The beasts, as in these cases they are seldom disposed or able to take the proper quantity of their usual food, should be well supported by nutritive mashes, and other such substances, as well as meals and water, of the oat, linseed, or other such kinds, that can be taken or thrown into the stomach; they should be constantly protected as much as possible from cold and wet, and be kept in as quiet and mild a state as circumstances will permit.

INFLAMMATION OF THE LUNGS.

This is not an unfrequent disease among neat cattle of different kinds, but more particularly among those which are worked or undergo much fatigue, and is produced by a great variety of causes.

It is brought on by the powerful effects of heat after exposure to severe cold or wet, and the additional effects of harsh, dry winds, which aid in constricting and shutting up the pores of the small vessels on the surface of the skin, and thereby interrupting due perspiration. It is, also, in many cases, produced by drinking copiously of cold water after being much overheated in any way, or by being much exposed to heavy rains or dews in the same situation, by any sudden change in the weather, and by the cattle being turned into fresh aftergrass or other rich pastures, while they are greatly overloaded with dews or covered with white frosts, as is the case at particular seasons. Whatever has the power of acting topically upon the lungs, such as the frequent breathing and taking in of very cold air into them, and other similar causes, which have a tendency to produce local inflammation, are often likewise productive of this disease. Want of sufficient protection, is, therefore, often a material cause in bringing on this disorder.

This is a disease, which in some cases, takes on a mild and flattering aspect, the fever, and inflammatory affection of the lungs, on which it chiefly depends, not rising to any great height,

the former and the heat of the body appearing to be only small, and but little increased above that of the common state, so as scarcely to be perceptible. While in other cases the disorder seems very rapid in its progress, the fever and inflammation of the parts both rising quickly to a great height.

The appearances which denote the commencement of the disease are, for the most part, much shivering, great oppression, and difficulty in the breathing, which are sometimes accompanied with a soreness in the sides of the chest upon pressure being applied, and a short tickling sort of husky cough or hoosing; the mouth is frequently thrown open, and the tongue put out to some distance, a ropy kind of slimy fluid is often discharged in large quantities from it, and from the nose a watery kind of mucilaginous liquid substance, which attaches itself in the manner of glue, to the inside of the nostrils; the eyes have a dull and heavy appearance; the pulsations of the arteries, both in the parts particularly affected, and over the whole body, are sometimes rather full and hard, but often natural and rather small; the inside of the mouth is occasionally parched up, dry, and harsh; the skin much constricted, stiff, and rigid; and the whole of the external parts are in a cold state, but there is a particular degree of coldness in some parts, as in the legs, feet, ears, and roots of the horns, with a speedy loss of the milk in cows.

The beasts, almost constantly, in these cases, appear full and swelled out, somewhat in the manner of those which are blown by the eating too greedily of some sort of green food and are not tucked up in the bellies.

The appearances which particularly mark the inflammation to have taken place, are the circumstances of the body of the animal quickly becoming alternately hot and cold, and there being a considerable height of fever, with a frequent hoosing, and a more quick and hurried state of breathing than usual in the beasts.

So long as the discharges from the mouth and nose are moderately free and abundant, the inflammation seldom makes any great progress; but as soon as they become interrupted in any way, or wholly stopped, it commonly advances in a rapid manner; and when not timely checked or removed, soon terminates in the destruction of the animals.

The beasts in this case, often for several days before the above appearances take place, are in an uneasy restless state, refusing their ordinary food, but taking water frequently where they can get at it.

The danger in cases of this sort, is commonly in proportion to the state of the fever and the inflammation in the part, as where they are to any considerable extent, there is constantly great risk of their running on so as to terminate in a gangrenous or mortified state in such affected parts, to throw out watery or other effusions into the cavities of the chest, or to end in the forming of swellings or suppurations in the affected organs, all of which are hazardous, troublesome, and difficult of removal. In less severe cases of this kind, however, there is seldom much to be feared, as the disease, for the most part, readily gives way under proper treatment.

In effecting a cure in this disease, great attention should be bestowed on the proper protection of the beasts, as well as strictly watching the above states, appearances, and circumstances, so as to suit the means of its removal properly to the symptoms. When the beasts are in a high state of strength and condition, with considerable accession and gradual increase of fever and local inflammation, and when the bodies and breathings of them feel in a hot, dry, and parching state; and especially when the

white parts of the eyes seem greatly inflamed and much tinged with a yellowish cast, immediate full and free bleeding will commonly be found highly and absolutely necessary in proportion to the size, strength, and state of the animals, and may be often repeated once or more according to circumstances. In other cases it may be sufficient only to take a smaller quantity at once, as the nature and violence of the fever and inflammation may demand; and if the beasts are very low in condition, and in a reduced state of strength, it will seldom be at all necessary to take away blood, as the disease may then generally be removed in a more safe manner by other means.

In cases of the first kind, after bleeding, in the manner and to the extent which is necessary to reduce and remove the inflammation and fever, the bowels, when bound, should be well opened, and kept in that state by the use of such medicines as these:

Take of—Sulphate of soda, in powder, four ounces,
Tartrate of potass, in powder, two ounces,
Ginger root, in powder, one ounce; mix and make them into a powder.

This may be given occasionally in a little thick oatmeal gruel or oatmeal and water.

A clyster may sometimes be found to answer the same purpose when composed of six or eight ounces of common salt, dissolved in half a gallon of warm water, with half a pint of common oil, and thrown up as necessary.

The quantity of a pint or pint and a half of castor oil may also be given with the same intention; but where that cannot be had, any common oil of the animal or other kind may serve the purpose.

The solution given below, may likewise be found beneficial in some cases:

Take of—Sulphate of magnesia, or purging bitter salt of Epsom, six ounces; dissolve it in three pints of strong infusion of senna, and when nearly cold, add
Strong ginger tea, four ounces, and
Syrup of buckthorn, two ounces; mix them well together.

This solution may be given alone, as in the above case, or jointly with the powder, where much effect is wanted.

As soon as the bowels, where necessary, have been well emptied by these means, the fever and inflammation if not wholly removed may be further brought down by the following powder:

Take of—Antimonial powder, two scruples and a half,
Nitrate of potass, in powder, two ounces,
Camphor, in fine power, two drachms and a half,
Root of contrajerva, in powder, one ounce and a half; mix and make them into a powder; which may be given once or oftener in the day, as there may be occasion in a quart of water with a little oatmeal in it.

Where the local inflammation and affection of the lungs continue without being fully relieved, much utility may, in some instances, be derived from shaving the hair from the sides of the animals, and applying very strong blistering liniments or plasters to them; a seton may also be put in as near the part as possible, and a full discharge promoted.

All sorts of stimulating and heating matters, though often ignorantly advised, should be wholly omitted as highly injurious, until the inflammation and fever have quite disappeared.

When the inflammation of the part and the fever have in a great measure disappeared, and there is yet a sort of hoosing or huskiness remaining behind, advantage may frequently be gained by such remedies as the following:

Take of—Nitrate of potass, in powder, and
Subcarbonate of potass, each one ounce and a half,
Myrrh, in powder, six drachms,
Benzoin, in fine powder, half an ounce,
Root of ginger, in powder, two ounces; mix them well and make a powder; which may be given once in the day or oftener, as the case may require, in about three pints of a strong decoction of bruised linseed, and sliced liquorice root.

Or the mixture below may be used for the same purpose, perhaps, with more effect:

Take of—Root of liquorice, sliced, four ounces,
Linseed and pearl barley, bruised, each two ounces,
Water four quarts; boil them in it for fifteen or twenty minutes, then pass the liquor through a coarse cloth, and add to it,
Tincture of opium, two drachms,
Spirit of nitric ether, or,
Sweet spirit of nitre, two drachms and a half; make them into a mixture.

The beasts should have steaming mashes and lickings made with bran, grains, and other similar matters, frequently given them in narrow pails, troughs, or other contrivances, and warm water for drink.

But when the hoosings and husky state of the animals appear more fixed and obstinate, the following may have a more powerful effect:

Take of—Root of squill, in fresh powder, one drachm,
Gum ammoniac, rubbed into a fine powder, three drachms,
Hard opium, in powder, half a scruple,
Submuriate of mercury, two scruples,
Benzoin and myrrh, in powder, each half an ounce.
Hard sope, sliced, six drachms; mix and form them into a soft ball, which may be given in about a quart of warm gruel, to which a little spirit has been added, as often as there may be occasion.

The above kind of mashes and lickings should be in these cases continued, with warm water as drink.

The use of waters impregnated with different substances, which are beneficial in similar cases of the horse, has not yet been fully ascertained in those of neat cattle, but there is every reason to suppose that they may be of equal utility.

In these cases, too, the ball recommended above, may not unfrequently be greatly assisted in its operation by the insertion of a rowel into the sides or other parts of the beasts, as near to the seat of the disease as possible.

When every kind of feverish or inflammatory affection is gone off, and the beasts only remain in a weak, feeble, and reduced state of body and condition, they may be greatly benefited and restored, in many cases, by the use of drinks, which contain the strengthening barks and other substances with the warm cordial seeds and roots, or that which follows:

Take of—Oak bark, in powder, three ounces and a half,
Cinchona bark, in powder, two ounces,
Root of Gentian, in powder, one ounce,
Grains of paradise, in powder, and ginger in powder, each six drachms,
Caraway and anise seeds, each two ounces and a half; mix and make them into a powder, which is to be given as a drink in warm ale or some other suitable liquid as there may be a necessity.

In all these cases, when the beasts are in the house, they should have plenty of room in the stalls or other places where they are put, and a free circulation of fresh air. Their legs and other parts may often be rubbed with great relief, but their drinking too freely of cold water at any one time, must be carefully guarded against, as it is apt to cause a return of the disease, until they become perfectly restored.

INFLAMMATION OF THE COATS OR LININGS OF THE CHEST.

This is a disease which is occasionally met with among neat cattle; but which is not distinguished from the above without considerable attention and nice discrimination, as the appearances of the two complaints have much similarity. It is produced by all the causes which have a tendency to bring on the former disorder, and frequently occurs in young cattle from their suddenly plunging into cold water, such as ponds, lakes, rivers, and other streams, after being violently heated by gadding in hot seasons, in fear of the flies, and at other times from using over exertion in any way so as to

cause them to be greatly overheated. The laying in full pastures, especially in cold nights, which have been greatly soaked with rain, or are much loaded with the moisture of fogs, dews, and other sorts of wetness, which hangs about them.

The inflammation sometimes only affects a particular part of these coats, while at other times it spreads over the whole or a large portion of them.

The danger in these cases, as in that of the former complaint, is mostly somewhat according to the state of the fever, and the situation, intensity, and space occupied by the local inflammation in the parts. The strength of the fever chiefly and very materially depends upon these last circumstances.

In this case, the disease most commonly comes on in a more sudden manner than in the former; there is less difficulty in the breathing, but considerably more restlessness and uneasiness in the animals. At first there is little appearance of fever, but afterwards it often rises to a considerable height, with a hurried and troubled state of the breathing, and much rising and working in the parts about the loins. The cattle frequently make an attempt to lie down, but as often rise up again in a sudden manner. There is sometimes a hanging down of the head; the ears and other extreme parts of the body become very cold, while some other parts of it are intensely hot; the mouth is dry and burnt up with heat; and the animal has a frequent inclination to make a sort of short hoose in order to be relieved from something which seems to be oppressive to it.

In the cure of this disease much depends upon its being attended to on its first appearance, as where it is suffered to run on without being checked or wholly removed, at that period, the local inflammation is liable to become so much increased as to terminate in the formation of matter in the part, or in a worse state.

In almost all cases of this nature, as in the above, a free full bleeding will be immediately required; and if the disease be not sufficiently abated by that, the repetition of it must be practised as often, and at such short distances of time, as the occasion may demand. The quantity of blood which is necessary to be taken away must be regulated by the state of the disease and the age, size, and strength of the beast. In strong large animals a full quantity may be taken in the first bleeding, but in old lean cattle, care should always be taken not to bleed too copiously at any one time, as they seldom bear it to advantage, and are apt to become speedily too much weakened.

The bowels where bound should, in all cases, whether bleeding be necessary or not, be well emptied by such means as those used in the above disease; and the same remedies be given for removing them.

INFLAMMATION OF THE STOMACH.

This is a disease which sometimes happens to neat cattle, and is for the most part probably the consequence of something hurtful contained in some part of the organ of digestion, with the complicated nature of which it seems much connected.

It is often sudden and violent in its attack, seeming to arise from over-full feeding on fresh grass, when the animals are first turned upon new pastures, thereby overloading the stomach and producing great injury to the powers of it. The irritating grassy matter which thus remains in the stomach from the want of re-chewing the food sufficiently is one cause; drinking too freely of cold water in an over-heated state of the body, or when in much perspiration, will

also occasion it; and sometimes it is brought on by an acrid irritating quality of the matters taken up with the food, as well as other causes.

The chief appearances of the disease are, evident sharp fixed pains in the stomach or some part of it, accompanied with burning heat in the whole or some part of it; the pulse being quick, but generally not very full. The heat of the breath in some cases is so excessive as to cause large blisters to rise and appear on the inside of the mouth and fauces. The animal is uneasy and restless, with much anxiety in its look. Every thing which it takes in as food or drink appears to increase the pain in the stomach on being swallowed, and is often resisted and refused with such force and violence as not unfrequently to bring on a painful and distressing cough. The extreme parts of the body are mostly cold, and the surface of the beast, in some cases, covered with a disagreeable cold clammy sweat. There is a sort of palpitation or beating of the heart, attended with a difficulty of breathing, as shewn by the noise that is produced by it. These are the principal appearances that mark the presence of this sort of inflammatory affection of the stomach, but there are occasionally some others which accompany the disease.

Where the disease is caused simply by offending irritating matters that are collected and lodged in the stomach, which is very often the case, it may mostly be removed by having them well cleared from it without any other means. But in the cure of the real inflammation of the stomach, the first thing requisite will be to take blood from the animal in a pretty plentiful manner, in proportion to the size, strength, and condition of it; and if the disorder still continue, it will be necessary and proper to repeat the bleeding until the inflammatory appearances wholly give way. The food and the articles which are given as mashes and drinks, in these cases, should be very sparing, and the latter on no account ever exceed the *warmth* of new milk, as when given hotter they may have a tendency to augment rather than lessen the inflammation in all such cases.

This is a disease which is so sharp and rapid in its progress, that it constantly demands the most prompt, expeditious, and powerful means of removal that can be made use of, or it will terminate in a fatal manner.

As soon as bleeding has been performed in such cases to a sufficient extent, the stomach should immediately be cleared of its crude irritating contents by some very gentle and cooling purgative, as much depends upon this being effectually and speedily accomplished.

For this use the remedy directed below is considered very efficacious:

Take of—Subcarbonate of potass, one ounce and a half,
Castor oil, eight ounces, rub it with Mucilage until wholly incorporated; then add,
Infusion of senna, one pint and a half,
Treacle or coarse sugar, two ounces; so as to form a mixture.

The whole to be given immediately in three pints of warm oatmeal gruel.

If this purge should not be sufficiently strong to empty the stomach and bowels at once, it may be repeated in the course of a little time, until the proper effect be produced.

In some cases the following mixture may perhaps be more useful, and at the same time less expensive:—

Take of—Sulphate of soda, ten ounces,
Tartarized antimony, one drachm,
Syrup of buckthorn, three ounces, mix and make them into a solution, by pouring two pints of hot infusion of Senna upon them in a proper vessel.

The whole should be given when just a little warm.

In all stages of this dangerous disease great

relief is constantly given by keeping the bowels well open by some sort of cooling purges, such as the above.

If the fever and inflammation of the part, however, still continue to increase in violence, the following powder may be found beneficial:

Take of—Antimonial powder, two scruples and a half,
Camphor, in fine powder, one drachm and a half,
Prepared shells, two ounces,
Coarse sugar, half an ounce; mix them together, and give them in three pints of warm oatmeal gruel for a dose.

In some bad cases it may be proper to continue this remedy twice in the day for some days; but where the appearances of the disease are more mild and favourable, once during that time may answer the purpose perfectly well.

The same antimonial remedy, in combination with a little hard opium produced by rubbing them well together in a mortar, will be found very beneficial in some cases of this nature, in removing the fever and the inflammatory affection of the parts, when given twice in the course of the day in a little oatmeal gruel.

When the appearances of the disease begin to give way, and the beast is gradually recovering its usual tone and strength of body, the tonic remedy below may sometimes be had recourse to with very great advantage:

Take of—Subcarbonate of iron, in fine powder, one ounce,
Oak bark, finely powdered, two ounces,
Compound powder of cinnamon, half an ounce; mix them well together, and give them in a large hornful of warm oatmeal gruel.

This may be given every third or fourth day for several times, as found necessary. By proper feeding and due management in this and other respects, the animals may quickly be brought again into their usual state and condition.

There is a case of this sort of inflammation in which the third division or part of the stomach is principally affected, and which is termed *Lakeburn*, by some. In it the affection begins in the third stomach, and is chiefly occasioned by the food not being sufficiently prepared to make its way through the stomachs and intestines; of course, it becomes hard and dry, and meets a stoppage in that part, which shortly produces an inflammation in it.

The particular appearances in this case are, shortness of breath, restlessness, cough, voiding little or nothing, and if any, that little of a blackish and pitchy consistence.

The cure in this affection is to be attempted by these means:

Take of—Sulphate of magnesia, or,
Epsom salts, six ounces,
Nitrate of potass, or,
Common nitre, two ounces,
Supertartrate of potass, or,
Cream of tartar, six drachms, dissolve them in
Infusion of senna, a pint and a half,
Peruvian balsam, half an ounce; mix and make them into a solution; which is to be given for one dose, as there may be occasion.

Food must be sparingly given, and be chiefly of the gruel kind, until the animal be quite relieved.

INFLAMMATION OF THE BOWELS.

This is a disease that occasionally happens to neat cattle, but is by no means common to them. It mostly arises from over-driving, or taking cold water too freely when overheated in any way; but it may be likewise produced by causes that induce too much constipation in the bowels, and some others of the same nature

Its presence is marked by the great restlessness of the beast, in whatever situation it may be; by the pulse being rather quick, without

having any great degree of fulness; by the breathing being interrupted; by the appearance of great heat, pain, and griping in the alimentary canal, attended with much thirst and uneasiness; by there being a rather loose or very constipated state of the bowels; and by the feel of coldness in the extremities. In cases where the disorder arises from too constipated a state of the bowels, the beast often lies down very much, and rises again with great difficulty, appears to be very full, though little or nothing is eaten; the eyes have a dull and heavy appearance, the pulse becomes more strong and full, though the external feel and look of the body is much as usual.

The disease is often speedy in its termination, when not properly attended to.

In the cure of this disease, the circumstances of it are to be well regarded.

In the first place, where inflammation is strongly indicated by the pulse, and in other ways, recourse must be had to full bleeding, in proportion to the size, strength, and condition of the beasts; after which, where the bowels are not loose but confined, the drink, as below, may be necessary:

Take of—Sulphate of soda, six ounces.
Supertartrate of potass, four ounces, dissolve them in hot
Infusion of senna, one pint and a half.
Castor oil, rubbed with mucilage, half a pint, mix them well together, and give the whole for one dose.

The infusion may be prepared, by pouring a quart of boiling water upon four ounces of the leaves of senna, covering them over and letting them stand for six or eight hours; then straining off the liquor for use by means of a fine cloth.

If the contents of the bowels be not well discharged by these means, a clyster, composed of half a pint of common sweet oil, a pound of common salt, and two quarts of thin oatmeal gruel, may be mixed together, and be thrown up into the rectum, just when milk-warm, by means of a large syringe, with great service. Where there are hardened fæces in the rectum, or straight gut, of the animal, they should, however, be first removed.

In case the feverish appearances still continue without much remission, the antimonial fever powder, directed in the above cases, may be used, as a beneficial means of completely removing the disease.

But in cases where there are not the signs of much real inflammation, and the animal is in the loose scouring state, weak, and much reduced, bleeding will generally be improper; but the following drink will be found serviceable in such cases:

Take of—Spirit of nitric ether, two ounces and a half,
Spirit of camphor, two ounces,
Tincture of opium, six drachms,
Oatmeal gruel, one pint and a half; mix them and give the mixture as directed above.

Where, however, from the nature of the keep, and other circumstances, there is evidently a costive state of the bowels, the above opening means are always to be used as soon as possible.

The same strengthening means, as in the above disease, may be here employed in restoring the condition of the animal.

During the whole continuance of the disease, the animals should be well supplied with oatmeal gruel, both to assist the operation of the remedies and support the strength of the beasts.

INFLAMMATION OF THE LIVER.

This is a disease which sometimes takes place among neat cattle. It is an affection that does not seem to be confined to any particular part of the liver, but which sometimes

has its seat in the membranous parts alone, and sometimes in the substance of it, as on the convex or concave sides of its lobes. But as the nature of the disease, and the cure and management of it are much the same, it is of but little importance what part is particularly attacked with the disease. It is probably, however, in some measure, connected with the nature of its organization and that of the gall-bladder, which, in this sort of animal, is very large. The disease may originate in the obstructions which the bile meets with in its passage through the liver, or from it, into the stomach and bowels, it being a glandular organ, destined for the purpose of secreting that fluid.

Inflammation of this organ may take place in consequence of various different causes, external as well as internal, but most commonly from those of the latter kind. The beasts which are the most subject to be attacked with this disease, are those which are in the best state and condition of body, such as fat and other well-fed sorts. Cattle are more particularly disposed to be seized with the complaint in dry hot weather, after being over-heated by driving, gadding, or running about in the pastures or other places; by drinking too largely of cold water in such condition; and by being exposed too suddenly to cold after their bodies have been too much heated in these ways, than in other circumstances.

This disease seldom, however, appears in a very active state, but generally in a slow inactive manner, proceeding to some length before it is discovered, so as to produce much derangement in the part and its connexions.

It sometimes proceeds from external causes, such as from goring by the horns of other beasts, or from violent blows or bruises near to the parts, caused in various ways.

The appearances by which the presence of the disease is particularly marked are principally these: intense pain and unnatural enlargement about the region of the short ribs on the right side of the body of the animal, accompanied with much difficulty in the breathing; a loathing of the food, great thirst, and a perpetual load in the belly; with a degree of yellowness diffusing itself over most parts of the body, but more especially on the whites of the eyes, and a palpitation or beating about the heart, commonly in connexion with a rather full and strong, though sometimes intermitting, pulse. There is, in most cases, a particular affection of some one part of the organ, which is sometimes mild, but at other times runs to some height. In cases where it inflames, suppurates, and discharges its contents into the belly or other important viscera or parts, the disorder often puts on a more dangerous and critical aspect, and there is then but feeble hopes of the restoration of the animal.

In all inflammations of the liver there is commonly a degree of danger, as where the inflammatory state of the complaint does not terminate fatally, they not unfrequently end in dropsical or debilitated states of different parts of the body, unless prevented by very good and careful management. It is supposed, however, that inflammations of this sort, which affect the lower or under part of this organ merely, are more dangerous and generally more fatal than those which attack the external or superficial parts of the liver.

In the removal of diseases of this nature when the inflammation runs high, it will constantly be necessary, in the onset of the complaint, to have recourse to bleeding and purging, in proportion to the size, strength and condition of the beast, as much relief often arises from both these means, and especially the latter, in such forms as these:

Take of—Sulphate of soda, ten ounces,
Tartrate of potass, two ounces, dissolve them in two pints and a half of the hot
Infusion of senna,
Syrup of buckthorn, two ounces; mix them, and make a purging solution, which, when just warm, should be given to the beast by means of a horn. Or, with these purging substances, nitrate and supertartrate of potass, in fine powder, may sometimes be combined, in the quantity of six or eight drachms, with good effect.

This solution, where it operates fully, is found very efficacious in removing the inflammatory causes of the disease, often speedily taking away the whole of the complaint, even where there is considerable constipation of the bowels.

In some cases, when the feverish appearances and inflammation begin to give way, much benefit may be derived from the use of mercurial frictions applied externally to the skin over the most affected parts of the liver, after the hair has been carefully removed from such places by shaving. These applications should be performed for several times together, during which the use of submuriate of mercury, in doses of two scruples or a drachm, should be had recourse to internally, as contributing greatly to the complete removal of the affection.

Some persons, however, prefer such laxative attenuating remedies as the following, considering them more suitable to the cure of these diseases:

Take of—Hard sope, well sliced, one ounce and a half, dissolve it slowly over a gentle fire, in
Castor oil, five ounces; then add
Sub-carbonate of potass, six drachms,
Aloes, in fine powder, ten drachms,
Rhubarb, in powder, three drachms,
Oatmeal gruel, one pint and a half; mix and make them into a drink, which may be given a little warm, as often as may be necessary to produce an open state of the bowels, as where this is neglected, the disease not unfrequently returns with increased force, and shortly proves fatal.

In cases where the state of fever and inflammation does not give way, after the bowels have been plentifully emptied by the above means, it will be necessary to repeat the bleeding to a suitable extent, continuing it as occasion may require, until such appearances wholly discontinue. Though strong drastic purges should not be employed in such cases, yet the bowels should constantly be kept well open: and the following powder may be given with benefit in many cases:

Take of—Tartarized antimony, two scruples and a half,
Sub-carbonate of potass, six drachms,
Nitrate of potass, in fine powder, two ounces and a half,
Hard sope, sliced and rubbed well down with the above, an ounce and a half; mix them well together into a powder, and give it in a pint and a half of oatmeal gruel, just warm.

This powder should be repeated as occasion may seem to require from the appearance of the disease.

After the disease wholly disappears, great benefit may often arise from giving the beasts steel, or the rust of iron, in combination with oak-bark, and aromatic seeds, in large doses, having at the same time recourse to the most nourishing and strengthening food in as large quantities as they can be taken, with suitable water and other drinks.

INFLAMMATION OF THE KIDNEYS.

This is a disease which is not of such frequent recurrence among neat cattle as is commonly supposed, but which, when it does happen, is frequently accompanied with very alarming and dangerous appearances, especially when under ignorant management, and recourse is had to the use of too heating and stimulating remedies, before the inflammatory state of the parts has been sufficiently reduced by proper means. These organs of animals are, however,

as much exposed, and liable to such inflammatory states, as any other internal parts of their bodies, as from the very large proportion of blood that passes through their minute vessels in a certain given time, they are very apt to have their extremities inflamed.

Inflammation in these parts may be brought on by many different causes; it may proceed from sprains, bruises, and severe blows and contusions about or across the lumbar region or parts of the beast; but it far more frequently is induced by the lodging and retention of small stony, sandy, or gravelly, matters, within the small vessels, cells, or other parts of the kidneys themselves; or from over-exertion in the animals, when too hard driven in dry and sultry weather. There are other causes and circumstances which may impel and force the blood too strongly and violently into the vessels or other parts of the kidneys, and thus bring on inflammation, which may also arise from the use of such water or food as load the fluids too greatly with sabulous and other such materials.

The common and usual appearances of inflammation of the kidneys are, a strong burning heat, attended with a sharp and severe pain about the region of these parts, or across that of the loins, which commonly extends along the ureters as far as the bladder; this heat is readily perceived by the application of the hand on the part, and when pressed, the beast will instantly give way in consequence of the pain afforded. The urine is mostly very high coloured, being sometimes of a dark reddish cast, and discharged in small portions, though with considerable pain and difficulty. Besides these appearances, there is sometimes a shivering or trembling of the whole body of the animal; a quick and not very full pulse, but mostly attended with a feverish state; cold clammy sweats are often present; and the extreme parts of the body, such as the horns, feet, and ears, are in general cold, though in some instances they are unnaturally hot. Much stiffness in the hind parts is usually displayed by the beasts when walking. The disease, therefore, is very different from that of Bloody Urine, or Red Water.

In case the urine comes away in small portions or in a dropping manner, and of a high colour, without the animal being much troubled in passing it, a conclusion may be formed that there is some morbid affection of the parts; indeed, the sudden cessation of pain, in these cases, and the urine distilling or dribbling away in small portions of a blackish colour and fetid smell, almost certainly indicate the approach of a mortified state of some of the parts of these organs.

The appearances that point out a more favourable termination of the disease, in these cases, are when the urine becomes rather high or dark coloured; when it is secreted and passed in much larger proportions than before noticed; and when, at last, it becomes large in quantity, thick, and intermixed considerably with mucous matter. In these instances, speedy relief may be expected in such affections of neat cattle.

In the removal or cure of most inflammatory affections of these parts, it is almost invariably necessary to begin, on their first attack, by taking away blood freely in proportion to the state of the disease and condition in which the beast may be at the time. The bowels should be kept open by castor oil and clysters of warm gruel and oil, and the following powder should be then given:—

Take of—Tartrate of potass, in fine powder, two ounces,
Tartarized antimony, two scruples,
Camphor, finely rubbed down, two drachms and a half; mix them into a powder.

In cases where there is but little fever or inflammation, the addition of a small quantity of Tincture of Opium may sometimes be made with great advantage.

Where the pain in the loins is severe, they may be well rubbed with the oily embrocation, as directed below, the parts being warmly covered.

Take of—Oil of turpentine, three ounces,
Essence of mustard, an ounce and a half,
Common oil, one ounce,
Solution of subcarbonate of ammonia, two ounces and a half; mix them for use.

In case an almost constant endeavour to pass urine continues with much pain and difficulty, it may often be useful to let the animal have a strong opiate clyster given, of two or three drachms of hard opium dissolved and mixed with three pints of oatmeal gruel.

In these ways the bowels will be properly emptied and the diseased parts much relieved, and the inflammatory affection greatly impeded and lessened.

INFLAMMATION OF THE BLADDER.

The inflammation of the neck or other parts of the bladder is but of rare occurrence among neat cattle, though it may be produced in them by any cause which acts violently or with much force upon them, or which prevents the free passage of urine; such as a high degree of costiveness, strongly stimulating diuretic substances taken in too large proportions, different kinds of sandy and gravelly materials, as well as concreting calcareous matters taken in with the water or drink of the beasts, and also by the effects of blows and contusions on the parts.

The disease is marked by the presence of fever, heat, and constant inclination to void urine, but without having the power or capability of discharging any, except in small dribbling portions. The pulse is mostly quick, but seldom high, and there is a peculiar restlessness in the beasts.

In the removal of affections of this nature, whatever is done should be attempted as quickly as possible, as much depends on it. On the first attack a little blood may be taken away, in proportion to the size and state of the beast, with great benefit; carefully avoiding the use of fluids and all kinds of forcing diuretic substances as much as possible. After which, a powder, composed of the materials directed below, should be given in a small quantity of oatmeal gruel once or oftener in the course of the day.

Take of—Camphor, well rubbed down, a drachm and a half,
Hard opium, fresh powdered, a scruple and a half,
Antimonial powder, two scruples and a half; mix them well together into a powder.

The bowels when constipated should be well emptied by the use of some mild purgative; or it may be better, in some cases, to throw up into the rectum rather strong clysters of the common salt and oil kind, just a little warm. Moderate doses of fine sope have been found highly beneficial in some cases.

Suitable small mashes are greatly useful while the disease lasts; and the strength and condition of the beasts may be promoted and restored by the use of suitable strengthening remedies, as necessary.

GENERAL INFLAMMATION, BLACK QUARTER, OR BLACK LEGS, &c.

This is a state of disease to which young neat cattle are exposed and liable under many circumstances; but to which they are most predisposed from one to three years old, and more generally in about the middle of that period. It is often of a very dangerous nature, and princi-

pally attacks those in the fullest condition, such as are lean or in milk seldom having this complaint. It is never seen in the winter, but is most prevalent in a warm spring and in summer. The disease is commonly supposed to be induced by the over indulgence of the beasts in rich juicy sorts of food, at these seasons, after the effects of a previous stinted keep, as they thus become too full and too much excited, and sometimes are so affected as to drop down suddenly and expire in a sort of inflammatory putrid state. Other causes, however, may occasionally produce it.

The appearances are, that it begins with a sort of sudden dullness and stupidity in the beast, which hangs down its head, rejects its food, is nearly motionless, and there is an almost instantaneous deprivation and destruction of the powers of the whole body. Oftentimes the animal is at once stricken down as it were; when swellings and enlargements in some part or parts of the body almost directly take place, which are accompanied with lameness, as well as with a sort of crackling noise on being rubbed over by the hand; which is occasioned by the air having got into the cells between the skin and the fatty substance; and when these swellings cannot be dispersed or be brought into a state of suppuration, a mortifying blackness appears in the parts, and the disease increases to its last state.

Such swellings are occasionally seen in different parts of the body, but most commonly first appear in the joints, though sometimes in the mouth, on the tongue, in the head, or on the back, shoulders, and belly. When in the back and near the loins, they have the most frightful aspect and tendency. Where the tongue is the first affected part, the mouth is mostly found open, and a sort of liquid matter issuing from it; and on inspecting the former, there will be discovered large blisters of a blackish appearance on one or both sides of the tongue that will readily give way to pressure.

In the cure of this disease, as it attacks in so sudden a manner and is often so fatal, the utmost attention and exertion are instantly necessary to check and remove the general inflammation, and prevent its running into the gangrenous state; which is to be attempted by the free use of such means as the following:

Bleeding is to be practised in proportion to the age, strength, and size of the beast; but it must be in the very first moment of the attack, or not at all, as it may then tend to remove the inflammation and prevent the swellings in the parts from taking place, but afterwards it would be injurious, as debility so soon comes on.

The full use of such remedies as are calculated to resist the progress of the disorder to termination in the manner just noticed must then immediately be had recourse to, and be persevered in, both generally and in a local manner.

Where the general inflammatory state does not run on too quickly, an attempt may be made to remove it in the following manner:

Take of—Antimonial powder, two scruples and a half,
Camphor, one drachm and a half,
Snake root, in powder, one ounce,
Liquorice powder, two ounces,
Coarse sugar, three ounces; mix and form them into a powder, which may be given in a pint and a half of thin gruel.

At the same time, the bowels should be well opened by a solution of six or eight ounces of the sulphate of soda, in an infusion of senna, with a little of the tincture and syrup of buckthorn, which should be continued until it produces the proper effect.

Should the above inflammatory state still continue or increase, it will then be more be-

neficial to have recourse to the form of powder given below:

Take of—Nitrate of potass, or,
Common nitre, in powder, two ounces and a half,
Antimonial powder, one drachm and a half,
Submuriate of mercury, half a drachm,
Ginger root, in powder, one ounce; mix and make them into a powder, which may be given in a little warm gruel every morning until the above state be removed, when the following may be used with great benefit, to which different other astringent strengthening matters may be applied in particular cases.

Take of—Oak bark, in fine powder, four ounces,
Best cinchona, or,
Peruvian bark, in powder, two ounces,
Subcarbonate of ammonia, in powder, three drachms,
Crude opium, in fresh powder, one drachm and a half,
Camphor, rubbed into fine powder, three drachms,
Powdered ginger, half an ounce; mix them and form a powder, which may be given in warm ale or gruel, daily, for several times.

At the same time, when the swellings in the legs or other parts require it, apply the following wash fully and frequently round the edges and over the whole of such swelled parts, keeping them constantly moist with it:

Take of—Sulphuric acid, or,
Oil of vitriol, one ounce,
Oil of turpentine, three ounces, unite them very slowly,
Compound tincture of camphor, one ounce and a half,
Best vinegar, three ounces and a half; mix them together, and shake the bottle containing them well when they are used.

The tincture of opium may sometimes be added to the above with great effect.

Or an embrocating liniment of this nature in some cases may be preferable:

Take of—Elder ointment, six ounces,
Neatsfoot oil, four ounces,
Oil of turpentine, two ounces and a half,
Solution of subcarbonate of ammonia, half an ounce; make them into a soft liniment.

The contents of the blisters in the mouth may be discharged, and well dressed with a solution of dried alum, and sub-borate of soda in vinegar, in the proportions of four drachms of the first, and two of the second to a pint and a half of the last; by means of a flexible rod of proper length, prepared at the end with sponge or rag for dipping into the fluid.

The beasts in these cases should be kept by themselves, as many of them are liable to be attacked at the same time, and every means should be taken to prevent the disease by inferior keep, and other proper means.

AFFECTIONS OF THE BRAIN, STAGGERS, VERTIGO, SWIMMING OR TURNING IN THE HEAD.

In some cases of this sort, the head and brain are affected and injured by the local pressure of matters of various kinds, so as to produce the above affections, unaccompanied by fever, such as the pressure of water, tumors, hydatids, and other local causes. Sometimes the same effects are produced by a diseased state of the stomach, and in various other ways, as neat cattle in different circumstances and situations are frequently seized with some of the appearances that are known by these several terms.

These affections are the most frequently met with in cattle which have been kept in a low, poor, starving state and condition during the winter season, and which are turned out upon the poorer pastures in the spring, so as to be in a very reduced state of body, when such causes as the above are readily generated and produced.

The beasts have the appearance of great stupor, dulness, and heaviness in the whole body, with a drowsiness and disposition to stagger and turn in a sudden manner, with much unsteadiness. There is great loss of in-

clination to take any sort of food, and a low feeble state of the pulse.

In the cure of local affections of this nature, the kind of causes by which they are induced should be well attended to, and the state of the debility or weakness of the beast be fully considered; after which, suitable strengthening remedies and stimulating applications should be made use of, so as to disperse such affections as much as possible.

It will never, or very seldom, in these cases, be necessary to take away blood from the beasts, at least in any large quantity, but to promote the removal and dispersion of the local affections, by the internal use of strengthening remedies of the bark, steel, and other such kinds in full doses. Previous to the use of these restoratives, however, calomel with camphor, opium, squills, and other alterative and correcting medicines in moderate doses should be administered, and local external applications of stimulant dispersing substances of the blistering ointment kind should be applied about the poll of the neck, close to the horns or parts where they rise; and on the sides of the upper parts of the head as near to the seat of the brain as possible. Such as the following may be useful:

Take of—Camphor, well rubbed down, two drachms and a half,

Submuriate of mercury, or calomel, two scruples and a half,

Opium, fresh rubbed into powder, two scruples and a half,

Squill root, in powder, one drachm,

Copaiva, as much as is necessary to make them into a ball, which may be given to the beast every evening, as there may be occasion, in a hornful of warm oatmeal gruel.

Or in some inveterate cases, the following will be more effectual:

Take of—Oxymuriate of mercury or sublimate, from one to two grains and a half, or more, as necessary, dissolve it in a pint and a half of water, then add,

Tincture of opium, three drachms,

Compound tincture of cinnamon, one ounce; and make a solution, which may be given every evening in a hornful of mixed warm ale and oatmeal gruel.

Then recourse may be had to the following powder for strengthening the beast:

Take of—common oak bark, in fine powder, three ounces and a half,

Sulphate of iron, or

Salt of steel, in powder, two drachms, and a half,

Gentian root, in powder, two ounces,

Root of ginger, in powder, one ounce and a half; mix them and make a powder, which may be given in a pint and a half of warm gruel, to which a little ale and spirit should be added.

As an external application to be used in the above manner, the form of ointment or liniment directed below, may be found very beneficial:

Take of—Oxymuriate of mercury, or sublimate, in fine powder, half a drachm,

Blistering or Spanish flies, in powder, three drachms,

Oil of origanum or wild thyme, two drachms and a half,

Black resin ointment, three ounces; rub and mix them well so as to make an ointment.

This ointment should be rubbed, by means of the hand, very well upon the parts of the head which have been noticed above, after the hair has been cleanly shaved off from them, once a day for some days; which, when it acts well, affords a speedy relief to the parts which are locally affected, and the beast becomes more lively and disposed to take food.

This application may be increased in strength, and formed into a liquid liniment, by leaving out the oil and ointment, and augmenting the quantities of flies and sublimate in the former, to two scruples or a drachm, and in the latter, to five or six drachms, adding, simply, five or six ounces of olive oil, for giving the proper

consistence. In this state it sometimes operates very well, producing great ease and relief to the beast.

Wherever, however, fever and inflammation are found to prevail, in such cases, the most active and effectual debilitating evacuatory means must be immediately had recourse to, such as those of full bleeding, purging, and others that obviate feverish and inflammatory states of the body.

SPASMODIC AFFECTIONS OR CONVULSIONS.

These are those involuntary and alternate contractions of the fibres of the muscles of an animal, which arise through the medium of the nerves. When they attack only particular parts, they are often attended with some kind of paralysis at the same time, by which means the affected parts are alternately convulsed and relaxed. A permanent convulsion or unnatural contraction of particular muscles is called,

A SPASM OR CRAMP.

These partial convulsions may attack almost any part of the body of an animal, and are frequently symptomatic in fevers, worms, &c. The involuntary startings of the tendons, in acute diseases, are all of them convulsive affections. Convulsions, even when most generally extended, differ from those of the epileptic kind, in not being attended with any abolition of sense, and in not being followed by the same torpid state. Convulsions, not only of particular parts, but also over the whole body, often take place, from causes not very evident. Sometimes, in young animals, they seem to depend merely on the irritability of the nervous system, which is strongly affected by slight causes: they, however, often take their rise from wounds, irritations of the stomach and intestines, occasioned by worms, poisons, violent cathartics, &c. They are always to be dreaded, but less in young animals than in those of a more advanced age. A recovery generally attends the removal of the existing cause of the disease.

In convulsions or tremblings from cold wind, exposure, &c., the beast should be kept warm and even be clothed: warm ale, with a cordial ball infused in it, and volatile alkali or spirit of hartshorn should be given in full doses.

The cramp is a severe local spasm of the muscles, accompanied with violent pain. Its removal is probably best effected by mercurial purges, bleeding, and opium, the warm bath, and topical stimulants.

SPASMODIC AFFECTIONS AND CONTRACTIONS OF THE MUSCLES ABOUT THE MOUTH, OR LOCKED JAW.

Affections of this kind are less common among animals of the neat cattle sort, than those of the horse; they, however, occasionally attack the former, and sometimes in consequence of irritating wounds and lacerations in parts where the nerves and tendons are injured or destroyed. Sometimes, too, violent contractions in these parts arise from substances taken into the stomach and bowels of the beasts, by their licking up poisonous vegetables, insects, or other matters.

In these cases the animals often have great difficulty in swallowing any sort of matters, and as the violence of the spasmodic contractions increases, the whole muscles of the part are suddenly affected, the jaws become closed, and so fast set as to require instrumental force to open them for the purpose of getting down proper remedies.

It may occasionally be necessary in these

cases to take away a little blood in proportion to the size, strength, and condition of the beasts, on the first attack of the disease, at the same time using opiates, frictions, and strong blisters to the parts; after which, a ball of one or other of the following kinds may be tried:

Take of—Hard opium, from one to two drachms,
Camphor, from two to three drachms,
Assafœtida, gum resin, six to eight or ten drachms; mix and beat them with syrup of ginger into a mass, so as to form them into a ball, which is to be broken down and given In a pint of warm gruel as there may be occasion, or,

Take of—Castor, in powder, from one to two drachms,
Camphor, rubbed fine, two drachms and a half,
Opium, fresh powdered, two drachms,
Subcarbonate of ammonia, in powder, or,
Volatile alkali, two drachms and a half,
Aromatic confection, half an ounce; mix them well into a ball, to be given as the above.

When the disease happens in the summer season, great benefit has been produced by sluicing the beasts well with cold spring water; and then rubbing them well down on the sides of the head and other parts with a dry wisp of straw, as where this is well performed on the legs, about the ears, and over the bodies of them, much relief is afforded; and warmth being afterwards applied, by carefully covering the animals over by means of woollen or other coverings, much greater effect is produced by it than would otherwise be the case.

Embrocations of the following kind may sometimes be applied to the contracted parts about the head and throat, with much advantage:

Take of—Soft sope, two ounces and a half,
Spirit of camphor, or,
Camphorated spirits of wine, four ounces,
Tincture of opium, three ounces; mix them well, and apply them as may be necessary.

Where the spasms and contractions of the muscles of the parts that are affected do not give way in the course of a day or night, in that case other methods must be had recourse to, such as those used in the case of *inflammation* of the *stomach*, in as full and complete a manner as possible.

Under good management and proper care, this disease rarely occurs.

LOCAL DROPSY, OR COLLECTIONS OF WATER IN THE CHEST, &c.

Though neat cattle are not by any means disposed to diseases of this local dropsical nature, they may, however, especially those which are in a low ill-fed poor state of condition, be sometimes exposed to such attacks: watery collections forming themselves occasionally, and taking place in this or other internal parts in a local manner. Where active inflammation has existed, and prevailed for some time in such parts in these animals, dropsical complaints may be produced either by the local weakness which afterwards takes place, or by the exertions of the vessels, during the active state of disease, throwing out watery matters, and forming effusions into the cells and cavities of such parts.

These collections may be supposed to have formed themselves in such cattle as shew a weak, feeble, and interrupted state of the pulse, with great and sudden loss of strength or power in the animal, much difficulty and oppression in breathing, frequent cough, sudden disinclination for food, and a fear or restraint on lying down in the usual manner: where the disorder is caused by the active or inflammatory state of the previous disease, and where, on regaining the inclination for food, the vigour and strength of the beast are not in any degree increased and bettered, the cough remains distressing, with equal disinclination to lie down, and the difficulty of breathing increases.

In dropsical cases, too, the water frequently shows itself in different parts of the body by soft swellings, and in some instances the limbs and the whole body are much swelled, and become very hard. The disease may sometimes be the effect of foul feeding, and the eating too greedily of the latter grasses. Dry keep with purges are necessary, in the first instance, and then strengthening remedies.

In order to remove such local or general complaints, powders formed of such ingredients as those directed below may be had recourse to in full doses, according to the state and condition of the beast:

Take of—Root of squill, fresh powdered, one drachm and a half,
Submuriate of mercury, or,
Calomel, one drachm,
Gum ammoniac, in powder, three drachms and a half,
Juniper berries, in powder, two ounces,
Root of ginger, in powder, one ounce and a half; rub and mix them well together, so as to form a powder; which may be given once or oftener in the day, as may be necessary, in oatmeal gruel with a little common gin added to it. Or,

Take of—Supertartrate of potass, or,
Cream of tartar, two ounces,
Jalap root, in powder, one ounce,
Juniper berries, in powder, three ounces; mix and make a powder, which may be given as the above.

These, in combination with strengthening barks of different kinds, have been found greatly beneficial in some cases of this sort, while the water is present.

After the disorder is in some measure removed, where the beast is worth it, it will be essentially necessary to throw in bark, rust of iron, salt of steel, and other bracing remedies, in full doses, so as to promote, support, and keep up, the strength, in the best possible manner. Much benefit also may be derived, in some instances of this nature, by the insertion of setons or rowels through the dewlaps of the beasts, or into proper parts of the chests of them, and retaining them in an open discharging state for some length of time afterwards. The application of strong blistering substances may be advantageously used, by rubbing them well on such parts, after the hair has been removed, several times in the day.

The beasts should be well supplied with the best fodder and mashes, when they become capable of eating and taking in food, in order to restore them to their proper state of condition.

AFFECTIONS OF THE LUNGS, HOOSE, OR COUGH.

This sort of complaint variously affects the older and the younger sorts of neat cattle. Cows and young cattle, or calves, being the most apt to be seized with affections of the lungs, which are frequently very harassing, troublesome, and distressing.

In cows the hoose, hurst, or cough, generally arises in consequence of being too suddenly exposed to much cold, either after the operation of calving, or after being put in too warm a house, shed or building, and then too suddenly turned out and exposed to the severity of inclement weather or seasons, by which such parts are inflamed, and an increased secretion of mucus is formed and thrown out into the *tracheæ* or windpipes of the animals, which occasions a continual irritation, tickling, hoosing, or sort of frequent cough, produced by the almost constant efforts of the animals to relieve themselves.

The appearances that denote the beasts to be affected in this way, in these parts, are a peculiar shortness and sort of catching of the breath; an almost perpetual inclination and effort to hoose, hurst, or make a sort of cough, which are attended with much difficulty and

labour in respiring, greatly affecting the lower membranous division by which the lungs are enclosed, and the different muscles connected with it; the pulse is commonly quick, and sometimes interrupted; and there is much loss of appetite in the beasts.

Where the disease is suffered to continue and proceed in its course, it is liable to form other local affections, and to end in fever with inflammation in some of the parts, which may soon destroy the animals.

The removal of affections of this nature may, in most cases be effected by the following means:

Take of—Copaiba, one ounce,
Barbadoes tar, an ounce and a half; incorporate them fully by rubbing them well with mucilage in a mortar: then add,
Compound tincture of benzoin, one ounce and a half,
Infusion of linseed, one pint,
Honey, three ounces; mix and make a pectoral mixture or drink; which may be given in a pint of warm oatmeal gruel, with half a pint of ale, and a small portion of some common spirit, every day or two for several times.

This remedy, when given in the early stage of the disease, or on its first attack, frequently removes the disorder in an expeditious manner.

Various demulcent aromatic seeds, in powder, are sometimes given with this mixture, in small quantities, as well as a little salt of tartar, but it commonly proves very efficient without these substances.

When, however, the disease has been of long standing, the remedy directed as under may have a better effect:

Take of—Sulphurated oil, or balsam of sulphur, two ounces and a half,
Copaiba, six drachms, incorporate them well by rubbing them with a sufficient quantity of the mucilage of acacia, or gum arabic, then add,
Vinegar of squill, one ounce and a half,
Tincture of opium, two drachms and a half,
Thin gruel, one pint,
Honey, two ounces; mix and form them into an emulsion or drink, which may be given to the beast in the same manner as the above, and repeated in the same way.

In some instances, the following powder may be found more useful in restoring the healthy action of the parts; and in removing the irritating causes of the disease:

Take of—Subcarbonate of potass, or salt of tartar, six drachms,
Hard opium, rubbed into powder, two scruples,
Benzoin, in powder,
Myrrh, in powder, of each two drachms and a half,
Precipitated sulphur, half an ounce,
Liquorice-root, in powder, two ounces and a half; mix them well, and form a powder, which may be given to the beast in the morning, fasting, in the same manner as the above mixture, and should be repeated every day or two as there may be occasion.

When there is a constipated state of the bowels, they should be well opened by the use of sufficiently strong solutions of the sulphate of magnesia or Epsom salt in boiling water; or (which may be better in some cases) by drinks composed of castor oil and sope, with purging powders of the aloe, senna, or other similar kinds, a little subcarbonate of potass, or salt of tartar, and the powder of ginger-root, or grains of Paradise. These remedies generally operate speedily and mildly, and should be repeated, as there may be occasion, until the desired effect be answered.

When the causes of the irritation and mischief are removed, the beasts should be well supplied with good fodder, and other substances; and should be confined to the house, except in very fine mild weather, when the pastures are dry; care being taken to prevent them drinking water too cold.

In the *dry* hoose, where there is much and almost incessant straining to hoose or cough, without any thing being discharged from the throat, the emulsion, or drink, directed below,

may be of great use in allaying the irritability and action of the parts:

Take of—Olive oil, three ounces,

Sulphurated oil, or balsam of sulphur, two ounces, incorporate them well together by rubbing them in a mortar with

Mucilage of acacia, or gum Arabic, as much as may be sufficient, in a gradual manner, then adding

Compound tincture of camphor, half an ounce,

Mixture of gum ammoniac, half a pint,

Liquorice-root, in powder, one ounce and a half; mix and form a demulcent drink, which may be given in mixture with a pint each of the infusions of camomile and penny royal, by means of a large horn, every day or two, keeping the beasts in rather warm situations, and avoiding the use of too cold water, as drink, as much as possible.

The use of strong blistering remedies of the ointment kind will likewise be found very beneficial when applied to the sides, and other parts of the chest, as near as possible to the seat of the complaint, by being well and frequently rubbed on such parts in their most active states.

By these means, this troublesome disease of neat cattle is, in most cases expeditiously relieved and overcome.

HOOSE, OR HUSK IN CALVES.

There is a *hoose* or *husky* cough, which often attacks calves during the early state of their growth, while they are kept in the home paddocks, or pastures, in the latter spring and summer months; and which, in hot and dry seasons, frequently takes off and destroys great numbers of such young stock, to the great loss of farmers and store-masters.

In cases of this kind, where, after a fatal termination of the disease, an examination of the *tracheæ*, or passages of the air in breathing, has taken place, a sort of netted or matted worm-like bunch or body of materials, in these parts, has been supposed to have been discovered, which, by the tickling and irritation which they cause and almost constantly keep up in them, render the young calves in nearly a continual state of hoosing, husking, or coughing, which greatly injures the lungs, and impairs the digestive powers; in many instances, rendering the animals incapable of re-masticating or chewing the cud. It cannot, however, be imagined, that such bunches of matters as these are real *worms;* they are more probably something of the coagulable lymph kind thrown out, and formed in this manner in such parts, by the great action produced in consequence of the disease. Indeed, worms are very rarely if ever found in any cases of disease in neat cattle; nor is it further likely that they could exist in such bunchy states in the gullets or passages into the stomachs of the beasts, through which such quantities of food are so frequently passing.

In these cases of disease, where proper remedies are not soon had recourse to, the calves speedily decline in condition, wear away, and become quite exhausted.

These consequences are to be guarded against and prevented by the early use of suitable remedies, such as those directed above, in the cases of hoose in cows and other cattle, the doses being properly suited to them.

Small doses of the pure oil of turpentine, in mixture with the compound tincture of camphor, in the quantity of one or two large table spoonfuls of the former, and two or three tea spoonfuls of the latter, have been found to remove disorders of this sort in calves, after they have continued for some length of time, and have resisted other remedies.

AFFECTION OF THE STOMACH, INDIGESTION, OR LOSS OF CUD.

This is a diseased state which sometimes takes place in neat cattle, and which produces much uneasiness and inconvenience to the

beasts in different respects. It generally comes on rather slowly, and is in some instances combined with affections of other internal parts.

The appearances which denote its presence are not at first very evident, but afterwards the windy belchings and eructations constantly breaking from the stomach plainly shew indigestion and the loss of power in it; there is a languid dulness in the looks of the beast, with a staring roughness and tightness in the coat and skin, a lessened appetite, and, after sometime, an indisposition to chew the cud in the usual manner, and frequently a slight yellowish tinge in the eyes and mouth. The bowels are sometimes in a loose state, and at other times constipated; when in the latter case more of the laxative means will be necessary, and in the former an increase of the cordial powder in the remedies.

The cure in these cases should be attempted as soon as possible, before any internal local part becomes much affected; first, by the use of such means as are described below, after which those of the tonic strengthening kind will be found very beneficial in restoring the healthy state of the stomach and of its digestive powers.

Take of—Subcarbonate of potass, or salt of tartar, six drachms,
Subcarbonate of ammonia, or volatile salt, three drachms,
Prepared shells, two ounces,
Aloes, in powder, half an ounce,
Compound powder of cinnamon, or,
Aromatic powder, one ounce,
Calomba root, in powder, half an ounce; mix and make them into a powder, to be given every morning or second morning until the violence of the disorder abates, when the cordial powders directed below may be used with good effect.

Take of—Guaiacum gum-resin, in powder, six drachms,
Opium, in powder, two scruples,
Rhubarb, in powder, three drachms,
Cascarilla bark, in powder, half an ounce; mix and make them into a powder, to be given in a pint and a half of strong warm ale every morning, until the stomach is restored and brought into a healthy condition.

Bleeding is rarely if ever to be had recourse to in this disease, as the affection is for the most part quite local in its nature, being confined to the stomach and bowels, but chiefly to the former.

In the more increased states of this sort of disease, in which there is a complete loss of the cud, great relaxation and local weakness of the stomach taking place, the beasts becoming extremely lean and thin, in consequence of the food being loathed and rejected, and so little nourishment prepared and afforded for their support.

In this case advantage may be found by the use of remedies of the following nature:

Take of—Sulphuric acid, or oil of vitriol, two drachms and a half,
Verjuice of good quality, about a pint,
Compound tincture of cinnamon, one ounce; mix them well, and make a drink; a hornful or two of which may be given several times in the course of the day, until such times as the food remains on the stomach, and digests in a proper manner, when the following powder may be had recourse to with propriety:

Take of—Rhubarb root, in powder, six drachms,
Gentian root, in powder, one ounce and a half,
Grains of paradise, in powder, six drachms,
Anise and coriander seeds, in powder, of each one ounce and a half; mix and form a powder, which may be given in a little warm malt liquor in the morning, and repeated as often as necessary.

The stomachs of cows are sometimes liable to be affected and put out of order by the too full use of grains or other rich substances of a similar nature. In this state, which is mostly termed *grain sick*, recourse should first be had to opening the bowels well, if they be bound, and then giving such stomachic remedies as have been advised in the above case; a strong solution of common salt with a full quantity of the common tincture of aloes will generally answer the former intention very effectually.

It should be given when the beasts are rather

empty, and as free as possible from loathing and rejecting their food, which is often much the case; they should then have full exercise in the pastures or other suitable places.

SUDDEN INDIGESTION, GORGED. HOVEN, BLOWN, OR FOG SICKNESS.

This is a sudden indigestion in neat cattle arising from the distention of the stomach, caused by the extrication of air from eating too much rich green succulent or other such food. The remedy of which must necessarily be the removal of the confined air. In slight cases of this kind the disease may sometimes be removed by the use of such remedies as have a tendency to arrest the progress of fermentation, or dispel the *flatus*. In this intention much advantage may be derived from the subcarbonate of ammonia, in large doses, dissolved in some spirituous liquor. However, in the more sudden and severe cases, the peculiar nature of the stomach in ruminant animals requires immediate recourse to suitable contrivances and manual aid, as explained below.

It is an affection which is distinguished by appearances and effects that are of the most distressing and harassing nature to the animals labouring under it; and which demands the most speedy attention and means of relief; otherwise great injury will ensue to the parts, from the great distention caused by the sudden extrication and expansion of a vast quantity of air, by which the lives of the beasts may quickly be destroyed.

The disorder occurs most frequently where the beasts have been newly feeding on green food in the pastures; the stomachs in consequence becoming greatly overcharged with such food; as the cattle by their greediness and great desire to eat such matters, neglect to lie down and re-chew the food they have taken in, by which neglect the first stomachs of the beasts are so filled and stuffed up as to be rendered incapable of contracting and returning their contained matters; fermentation and decomposition is soon induced, by which a very large quantity of air is formed and set at liberty in these confined parts, which air swells and distends such parts of the beasts in a very extraordinary manner; and which, having no means of escaping, enlarges the beasts in such a way as sometimes to occasion suffocation, or a rupture of some of the parts.

In order to prevent these unpleasant accidents and effects among neat cattle, and sometimes their sudden destruction, it becomes necessary to use great care and circumspection in first turning them out into fresh full pastures, where the grass is of the more juicy sweet kinds. They should never be suffered to continue for too great a length of time at once upon them, but should be taken out again, and driven to the home yards or put upon some closely fed spots, where there is but little to be picked up by them; so that the processes of chewing the cud and the digestion of the food may take place and be properly and effectually performed. Attention to this management for a very few times will be sufficient to remove that great voraciousness and greediness of feeding, which causes the animals to eat so abundantly. By this sort of care, the disease may be prevented, a circumstance well worth the regard of farmers who are much interested in the business of the dairy and the milk-house, or in other ways.

Beasts are necessarily the most liable to this kind of disorder during the summer, or in the early part of autumn, when the grass is in abundance. The appearances are, that the animals are greatly swelled and enlarged about the stomachs and first passages, with great distress in

their countenances, a difficulty of breathing, and a constant restlessness and uneasiness.

It has been supposed by some persons, that when such rich succulent grassy matters are much loaded and impregnated with moisture and dews, they are a great deal more dangerous and injurious in this way than when the contrary is the case, and, consequently, advise that the beasts should never be turned upon such sorts of food when in this wet state: others, however, contend in an equally strong manner, that the state of the food in this respect has no difference of effect whatever in the production of the accident; which is probably more correct, as it would seem, that the sudden extrication of air, from the decomposition of such rich grassy substances, is the cause of the mischief, without the condition of them in regard to moisture or dryness having any sort of effect.

With the view of removing this kind of accidental affection of the stomachs and first passages in neat cattle, a great variety of remedies and other means have been proposed; of the former of which the following will be found very beneficial in slight cases as already suggested:

Take of—Subcarbonate of ammonia, or volatile salt, six drachms,
Subcarbonate of potass, or salt of tartar, one ounce,
Ginger root, in powder, two ounces and a half,
Cascarilla bark, powdered, half an ounce; rub them well into a fine powder, and give it to the beast in a quart of warm ale with a little gin as soon as ever the disorder is discovered. Soon afterwards, a strong solution of the sulphate of magnesia, or Epsom salt, in boiling water, should be given, with two or three drachms of the root of jalap, in fine powder, so as that the bowels may be well and speedily opened, and the flatus, or confined air, and other matters be carried off in that way as well as upwards.

By these means, such affections, swellings, and blown or hoven states of cattle may be removed without much difficulty, in an expeditious manner. But when they are found more severe, and to resist such remedies, recourse must be had to other means and contrivances of different kinds, such as the following

CONTRIVANCES OF THIS KIND.

A contrivance for this purpose was described and presented to the public by the late professor of anatomy in the university of Edinburgh. It consists of a fine iron wire, which is twisted into a kind of flexible tube of a suitable size, and coated over with a fine smooth soft leathery substance. The length of it is rather more than six feet, as it was found that the distance from the fore teeth to that of the first stomach of a large beast of the ox kind was full six feet, and of course the tube should be somewhat longer to afford ease and facility in introducing it. It is proper to introduce it in a gradual and gentle manner, through the throat of the beast, into the first stomach, which is usually the seat of the mischief; as upon entering it a large portion of the *flatus*, or gaseous material, passes away; by the removal of which much ease is afforded to the beast. And as no impediment to the breathing of the animal is produced thereby, it may be suffered to continue in the part for a short period.

But a more ready, cheap, convenient, and simple contrivance of this nature, and which has been used with perfect success, has been invented by Mr. Eager. It is constructed of two different sizes or dimensions, so as to suit neat cattle and sheep. That for the former consists of a round small knob of wood, which is well and securely fastened to the end of a flexible cane rod six feet in length. In using it one man lays hold of the horn with one hand and the dividing portion of the nostrils of the beast with the other; while another seizes fast hold of the tongue of the beast with his left hand, and with the other the cane is pushed gently down the throat of the animal. On the

entrance of the cane thus prepared into the stomach of the beast, much mephitic air or *flatus* is discharged, as shewn by the body of the animal contracting to its natural state and size, and the beast becoming quickly restored to its former state of health and condition, but the tube may be suffered to continue without injury until the whole of the confined air has been removed.

Where none of these contrivances are at hand, any rod-like flexible material of sufficient length may be prepared, and armed for the purpose by having a small egg-like smooth wooden knob well fixed to its lower end; or a small piece of sponge so fastened may be better, which, on being dipped in oil, may be passed down into the stomach of such animal in the same way, and answer equally well.

These sorts of contrivances are kept ready prepared for use by different persons in the metropolis, and other large towns in the kingdom; and they should be ready in every place where cattle are kept in any quantity, as being very convenient and useful in cases of great emergency.

STABBING.

There is another operative mode of discharging the *flatus* or confined air in sudden and dangerous cases of this nature, where the beast is so swelled as to be scarcely able to stand and support itself; which is by taking a sharp-pointed penknife of proper length, and passing it gently in a puncturing, or what is often termed *paunching* manner into the paunch, or part containing the air, in the middle of the space between the haunch bone and the last rib on the left side of the beast, which, in most full-grown beasts, is about the distance of three inches from the point of the short ribs. By this means instant discharge is given to most of the confined and pent-up air, which affords great relief to the animal; and the puncture may afterwards be preserved in an open state by the introduction of a small tube of any sort, of sufficient length, into it, so as to remain until the whole or a due portion of the enclosed air be taken away. It may then be withdrawn, and the opening secured by means of a pitch or other sticking plaster being laid over it. It is the opinion of persons of experience, that there is little or no danger in puncturing or paunching hoven beasts in this manner, except where the operation is performed in an improper place and direction.

When the *flatus* has been taken away by some of these means, and the body of the beast is become lessened to its usual size, the use of stimulating cordial drinks, such as are composed of the different aromatic seeds and barks in large quantities, as some ounces of each, in combination with spirit of nitric ether or the sweet spirit of nitre, in good quantity, as an ounce or more, or the oil of turpentine in a less proportion, as about half an ounce, are recommended. By such means, the strength and health of the beasts may be speedily restored in most cases, but if they are not sufficient for the purpose, other strengthening remedies may be used, as from the weakness which is left in the stomach in such cases there is at times danger to be apprehended.

The form given below has been found very useful in such states:

Take of—Cascarilla bark, in powder, half an ounce,
Gentian root, powdered fine, one ounce and a half,
Root of ginger, in powder, half an ounce; mix and give them in a quart of the infusion of camomile flowers and warm beer as there may be occasion.

By these means, and at the same time preventing the beasts for some days afterwards from feeding too fully, they may in general be soon

perfectly restored, and the return of the disorder be wholly prevented.

AFFECTIONS OF THE APHTHOUS BLISTERY KIND IN THE MOUTH, THROAT, AND ALIMENTARY CANAL, OR BLAIN.

The beasts are most commonly liable to be affected in this way when the weather begins to be hot and sultry. It has been imputed to many causes, but is most probably of an inflammatory aphthous nature, as blistery bladders arise in the parts affected, which, by pressing on the windpipe, sometimes produce suffocation, or cause the beasts to swell in a very great degree.

The appearances are the following:—the beast is all of a sudden seized with a swelling at or about the nose; it pants much, and has a very quick breathing; its eyes are swelled and irritated, having a constant watery appearance arising from them; a sort of large blisters arise, and shew themselves at and about the root of the tongue, as well as through the whole canal of the bowels, and if not soon relieved by suitable remedies, the beast swells much, and the blisters appear large at the fundament, which with the shape are often swelled, and assume a sort of liver colour; the beast loses its appetite for food, and gradually declines in condition, if the disease be of any continuance, which, however, is seldom the case.

Such means as these will be found useful in removing affections of this nature in most cases:

Take of—Submuriate of mercury, or,
Calomel, half a drachm to one drachm,
Prepared shells, in powder, two ounces and a half,
Jalap root, in powder, three drachms,
Honey, as much as may be sufficient to make them into a ball. This should be given in the evening in a little oatmeal gruel; and in the morning the bowels, where they are bound, should be well opened by a purging solution composed of six ounces of the sulphate of magnesia, or Epsom salt, and three drachms of the powder of the root of jalap, or an ounce of the tincture of the same. The sulphate being dissolved in a pint and a half of boiling water, and the other ingredients added as the solution gets to a slightly warm state. The beast may be driven about for a little time after taking this purging remedy with advantage in promoting its operation.

Some persons recommend the practice of breaking blisters of this sort in the mouth and throat by the hand, and those in the rectum by raking the dung out of the straight gut backwards; slight and full bleeding, according to circumstances, are also sometimes useful, but should seldom be had recourse to, except for beasts in very full condition. The following remedy may be beneficial in correcting the habit and tendency to the formation of these sorts of aphthous blisters:

Take of—Subcarbonate of potass, or,
Salt of tartar, one ounce,
Subcarbonate of ammonia, or volatile salt, two drachms, dissolve them in a pint and a half of the
Infusion of camomile,
Compound tincture of cinnamon, six drachms; make a solution, which give to the beast as there may be occasion in a little gruel.

It has lately been proposed in the curing of this complaint to pass a flexible rod of proper length, prepared by fastening on the end of it a ball or cushion about the bigness of a large egg formed of flannel, stuffed with wool or some other soft substance, down the throat into the great bag or stomach of the beast, after being dipped well in common tar, letting it remain there for a few moments to disperse the tarry substance, and then drawing it up in a very gentle manner, the more slowly the better, as the more *flatus* will be discharged, which often greatly relieves the animal. This operation should be repeated about three times, when the beast will be greatly relieved, if not wholly cured.

After this process, a mixture of common salt and urine, in the proportion of a pint of the

former to a quart of the latter, after being well united and dissolved, is to be given, which is said to operate favourably by keeping the body open, and preventing any inflammatory tendency. As the bladders or blisters in this complaint, which are in the throat and about the root of the tongue, if not removed, increase in size and tend to choak the beast, as before described, the operation of putting the rod or cane down the throat is intended to break them; while the tar, from its nauseating quality, occasions the beast to discharge much thick slimy matter, and to cough and sneeze or snort violently, by which much flatus is passed backwards, which efforts tend greatly towards the cure of the disease. When these means have been used, the beasts should be put in roomy pastures or places where there is water, as they drink much and are benefited by walking about.

If the disease, however, be of an inflammatory nature, there appears to be much danger of increasing it by this mode of proceeding, as the tar and urine are both highly stimulant matters.

IRRITABLE AND FLATULENT COLIC, OR GRIPES.

Cows, oxen, and neat cattle, of almost every age and description, are liable to be attacked and affected in this manner, and the affection would seem mostly to proceed from some irritability or spasmodic contraction taking place in some of the different parts of the bowels. There may be various causes of this complaint, but the principal are, the too great use and indulgence in matters of the raw, indigestible, succulent, grassy kinds; the too great exposure to severe cold in different circumstances, or the taking of too large proportions of cold water as drink, under unfavourable states of the body; and the feeding and filling the stomach too much with dry, hard, chaffy, strawy, and other similar matters. It is occasionally attended with an open, loose, and natural state of the bowels, but more frequently with that of constipation; in the former of which it mostly comes on in a somewhat sudden manner, but in the latter commonly more slowly. This last is probably an increased state of the disease, in consequence of the too great delay of such hard substances in the two last stomachs.

The appearances in these cases are, that the beasts frequently lie down, and as frequently rise up again in a sudden and restless manner, sometimes groaning and striking their horns and hind feet against their bellies. The pulse is rarely much altered at first, but if the affection continues for a length of time, it becomes a great deal quicker, harder, and more full, than in the usual state of the beasts, which points out, in most instances, the advance of great irritation and inflammatory action in the parts, being attended with great tension and distention of the bellies of the animals, and, in some cases, with a noisy rumbling. There is sometimes a coldness in the ears, feet, and horns, which marks the fatal termination of the disorder.

This increased state frequently proceeds in so rapid a manner, as to produce not only much injury and disorder of the parts, but the destruction of the beasts, if not speedily relieved. There is often a considerable degree of constipation in the bowels, which has the effect of impeding or resisting the passage of the matters contained in some parts of them, causing distention and irritation, and occasionally acting on the inner coats of the intestinal canal so as to produce this sort of spasms, twitchings, and severe griping pains, and, at length, inflammation. Such spasmodic griping affections may likewise arise from a variety of other dif-

ferent causes, to which animals of this sort are continually more or less exposed.

In the removal of the first state of these affections of the bowels, when they are in the loose or natural condition, and the beasts are weak and much reduced, great benefit and relief may be derived, in many instances, from the use of such means as the following, when well and fully applied, as no blood should be allowed to be taken away in such cases:

Take of—Camphor, two drachms and a half.
Hard opium, one drachm and a half, rub them well down into a fine powder; then add,
Grains of paradise, in powder, one ounce,
Root of ginger, powdered, and
Coriander seeds, in powder, of each six drachms; mix and make them into a powder, which may be given in a horn or two full of beer, with half a gill of common gin mixed with it: or, in some cases, the following remedy may operate more quickly in removing the spasms and expelling the air set loose in the intestines:

Take of—Oil of turpentine, six drachms,
Tincture of opium, half an ounce,
Compound spirit of juniper, four ounces; make a mixture; to which add a pint and a half of warm ale at the time of giving it, and two ounces each of the well-powdered seeds of anise, sweet fennel and caraway.

By the use of these means, and the cautious feeding of the animals for some time afterwards, a proper state of the stomach and bowels may be perfectly restored.

In cases of these kinds, remedies of the astringent binding sort are seldom or ever to be employed, except where there is greatly too open a state of the bowels, as beasts are often destroyed by the improper use of them.

Where the bowels are in a constipated state, no time should be lost in the removing of the complaint by the use of such forms as those directed below:

Take of—Castor oil, a gill and a half, rub it well with mucilage until fully incorporated, then add,
Subcarbonate of potass, or salt of tartar, six drachms,
Tincture of jalap, half an ounce,
Syrup of buckthorn, three drachms; mix and make them into a mixture; giving it directly to the animal in a pint and a half of warm oatmeal gruel, and repeating it as there may be a necessity. The sulphate of magnesia, or Epsom salt, in the quantity of five or six ounces, in solution with a strong infusion of the leaves of senna, in the proportion of a pint and a half, with a little syrup of buckthorn, may, however, sometimes operate more expeditiously in producing a passage, and causing an open state of the bowels.

Where, however, little effect is produced by such means, and the beasts begin to swell and enlarge in the body, it may be advisable to take away a quart or three pints of blood, in order to restrain the violence of the spasmodic action, and the irritability of the parts, and prevent the tendency to inflammation. This should be particularly the case where the beasts are in high condition and full keep.

A little while after such bleeding, in different cases, it may likewise be useful to open the bowels well by the same means as above, but care should constantly be taken not to bring the beasts too low by such means.

The following mixture may also be given with good effect, in many cases, in lessening the state of irritability, spasmodic contraction, and griping pains, after the inflammatory tendency has been somewhat removed by the bleeding, and other necessary means:

Take of—Tincture of opium, three drachms,
——— castor, half an ounce,
Oil of juniper, two drachms and a half,
Spirit of cinnamon, three ounces; form them into a mixture, which may be given, as there may be occasion, in a quart of thin gruel, warm stomachic pounded seeds being added when necessary.

The operation of the opening remedies, and the effects of the anti-spasmodic mixture, may often be greatly promoted by the use of such clysters as the following, thrown up into the bowels once or twice in the day:

Take of—The decoction of tobacco, and pounded
Linseed, made by boiling one ounce and a half of the former, and four ounces or more of the

latter, in two quarts of water to one, and then straining off the liquid, adding of

Common salt, four ounces, the same quantity of

Common olive oil, and a little coarse sugar; make a clyster, which may be used while a little warm. These, besides softening and relaxing the constricted parts and matters, are powerful in promoting the discharge of the latter, which affords great ease to the animals.

Where the suitable opening remedies are not immediately at hand, common salt, with any oil or lard, that is sweet, may be used, in the quantity of six or seven ounces each, and will answer the purpose.

The health and condition of the beasts may afterwards be restored by the use of cordial, restorative, strengthening drinks, as occasion may require, the bowels being carefully kept open and in a proper state for some time after the disease is removed.

There is a disease of the bowel kind, common among oxen in Herefordshire, which is known and called by the name of *Gut tie;* the appearances of which are much similar to those occasioned by cholic pains. It has been absurdly supposed to originate in violence done to the animal, when a calf, in the act of castration, by a rude and careless drawing out of the testicles. The signs of the disease are those of a complete stoppage in the guts, except a discharge of bloody mucus, attended with considerable heat and fever. The animal kicks at its belly, lies down, and groans. The result may be a mortification, and the speedy destruction of the animal, in the calf state; or it may survive to become full aged, and yet be subject to a sudden attack of this nature. It has been usual in the above district, in order to remove the complaint, to perform a disagreeable operation, by making an incision, in a perpendicular manner, four inches under the third vertebræ of the loins, over the paunch or stomach, and introducing the hand to discover the affected part, or the *gut* that is supposed to be *tied,* and removing the string that causes it, the animal being supported during the time in an upright position. The existence of such a disease is, however, very doubtful; and the utility or necessity of such an operation upon a full-grown beast highly questionable. It is very probable, that a calf may be bruised or lacerated while gelding, but it is as likely to suffer by cold being caught in the parts. The cure by operation is absolutely as dreadful as the disease, and therefore highly improper; and it is not improbable, but that strong saline laxative remedies, with oil, may answer the purpose in a much better and more safe manner.

EXCESSIVE DISCHARGES FROM THE BOWELS LOOSENESS, SCOUR, OR DIARRHŒA.

This is a state of disease which frequently takes place, and greatly reduces, injures, and not seldom destroys, neat cattle of different ages and kinds. It is sometimes very slight and mild in its nature and effects; readily disappearing of its own accord, without the use of any remedies; while at others it is extremely violent, distressing, and hurtful, to the animals, and scarcely to be removed by the most powerful means.

It may proceed from a variety of causes, according to circumstances; as from the too great acridness or abundant acidity, the crudeness, or putrescent state of the alimentary matters, which have been taken in by the beasts; the too abundant or too active state of the bile; the sudden obstruction of the perspirable discharge by cold; the prevalence of putrid noxious exhalations; and the morbid matter arising in other disorders being discharged and carried into the bowels. It may also proceed from too much exposure to northerly winds and storms, in the spring season, as these operate very

powerfully on the bodies of neat cattle that have been stinted in the previous winter months, and frequently induce this state of disease. Cows, also, that have lately calved, are very apt to be seized with this complaint. But the most general causes are, great exposure to severe cold and heavy rain, when heated by too hard working or driving; and drinking too freely of cold water in such a state of the body. Too much milking, and the want of sufficient support, as well as a change of situation from that of a warm one to one which is more cold and damp, likewise induce this disease. Beasts which are in bad states of body, and those which get weak from age, or from having many calves, are more liable to it than others. It may, however, arise in various other ways, and may be brought on by some accidental causes. It is often known by the name of *scouring rot*, and *rottenness*.

It is the most apt to attack neat cattle in the more advanced spring months, particularly when the weather is inclined to be wet with coldness, the pasture grass in plenty, and the quality of it rich and juicy; in consequence of which the beasts are liable to take in too much, and thus overload the parts, by which digestion is impeded and great mischief of this sort frequently occasioned.

The appearances of the disease are, that the excrements of the animal are sometimes large, slimy, bilious, or black, in their quality; at others, occasionally they are thrown out largely, in a thin and fluid state, like water; and in still other cases, they have a frothy, greasy, skinny, mixed fat, clay-like aspect, being mostly ejected with great straining and spasmodic action of the bowels, which cause the animals to suffer much pain and uneasiness. In the former of these stages, the beasts generally continue to feed and chew the cud, though they keep declining in flesh and condition; but as the latter takes place, the food is but little masticated, and the power of digestion is almost wholly lost.

There is in general, also, a want of inclination for food, a weak depressed pulse, a dry harsh state of the skin, a dulness of the countenance, and sometimes a slight low feverish state. When the animal, especially if a cow, loses its appetite in these cases, the dewlap hangs down with a flabby appearance; the dung runs off with a putrid offensive smell, and as it falls upon the ground rises up in a bubbling manner; and the hair all over the body stands in a staring upright manner. These appearances point out an unfavourable state of the disease, and that there is little chance of putting a speedy end to it.

It is supposed, also, that when the beasts have been for some time diseased in this way, there is much pain, shrinking, and uneasiness felt on the sides of the back, just behind the shoulders, when closely pinched by the hand, which is frequently tried by those who deal in cattle, to discover if they are affected with this sort of scouring rot.

Scours or loosenesses of this nature, if of considerable duration, are almost constantly accompanied with danger, as the frequency of the efforts of the bowels to reject and get quit of the offending matters which they contain, speedily reduces the beasts to a most weak and feeble state of body, with loss of desire for food, which not unfrequently become the source of some distressing and obstinate local disorder, unless timely taken care of and remedied. There is often found, on examining the bodies of such cattle after death, much diseased tenderness, with dropsical and contracted states of the coats and other parts of the intestines, and considerable affection and disorganization

of different parts of the liver, as well as other morbid appearances.

Beasts, attacked with this disease in the winter or early spring, should be immediately brought up from the grass pastures in which they may be, and shut up in the open airy cattle-yards near the houses, where they may be protected from bad weather; and should be kept wholly on dry fodder and other matters of that sort, such as good hay, cut chaff, reduced oil-cake, and grain of the less valuable kinds. Suitable portions of this kind of food should be given the beasts twice or oftener in the day, which, with the measure above recommended, generally checks and restrains the disease, affording much relief to the animals. When, however, the beasts are greatly reduced in their condition, and shew no sort of disposition for the taking in of the usual kind of food, it may sometimes be useful to let them have a thick oat, or other meal gruel, given them by the horn, several times in the day; as by carefully supplying the animals in this way, sufficient nourishment may be afforded to keep them up under the cure of the disease. But, in general, much expense will be thrown away where they cannot be made dry or fit to kill.

In the removal of disorders of this nature, much attention should constantly be paid to the causes of the disease; and also to the manner of feeding and foddering the beasts, care being taken that they eat nothing which may operate unfavourably upon the bowels, in exciting and forcing such discharges from them, as must be the case with all raw, crude, indigestible matters of the grassy or other kinds. The parts are then to be strengthened, the frequent tendency to pass or throw out the contents of the bowels allayed, and the too numerously repeated discharges or dejections corrected and restrained. These are to be effected by such means as the following, when in the first stages of the disease, it is suspected that any acrid, bilious, or irritating matters are lodged in the bowels:

Take of—Submuriate of mercury, or calomel, one drachm and a half,
Root of rhubarb, in powder, half an ounce,
——— ginger, in powder, one ounce; mix them into a powder, and give it in a pint of thick gruel for once or twice, the beast using warm meal and water and being kept from cold.

Recourse must then be had to the more mild correcting astringent means as below:

Take of—Extract of catechú, or of logwood, three drachms,
Prepared chalk, three ounces and a half, rub them with
Infusion of linseed, two quarts,
Tincture of opium, three drachms,
——— ginger, one ounce and a half; mix and make them into a drink, which may be given as there may be occasion, after the above powder has cleared the bowels.

When these remedies have put a stop to the looseness or scourings, the beasts should afterwards be carefully brought to their natural state by being suffered gradually to feed and drink in their usual manner, so that the strength of the parts may be restored before they become again too much exposed.

The mucilaginous starchy substances, which are often given in these cases, have but little effect; as they are quickly almost wholly changed in the stomach, and lose their efficacy.

But when such means as those above are not sufficiently powerful in restraining the disease, others, such as the following, must be employed:

Take of—Ipecacuanha root, in fine powder, three scruples and a half,
Hard opium, in powder, two scruples,
Oak bark, in fine powder, two ounces and a half,
Compound powder of cinnamon, or,

Aromatic powder, three drachms,

Root of rhubarb, in powder, two drachms and a half,

Subcarbonate of potass, or salt of tartar, six drachms; mix them and make a powder, which may be given in a little gruel milk-warm.

Or the following drink may be better in some cases:

Take of—Calcined hartshorn, in powder, six ounces,

Common salt, in powder, five ounces,

Chips of logwood, two ounces,

Acacia, or,

Gum arabic, four ounces; boil them in two quarts of water to three pints; then strain off the liquor and add of

Tincture of rhubarb, half an ounce,

Tincture of opium, two drachms and a half; mix them and make a drink, which is to be given in the same manner as the above powder.

When any sort of laxative or opening remedy may be thought necessary, the use of castor oil in the form of mixture, or the powder of rhubarb, will be the most suitable for the purpose, as strong purgatives of the aloetic or other powerful kinds are often injurious.

A powder composed of dried alum, finely powdered, in combination with prepared chalk in powder, and opium, has been found in some instances to answer extremely well. The first in the proportion of about three ounces, four or five of the chalk, and two and a half or three drachms of the fresh powdered opium.

Where these means, however, are not effectual in removing such complaints, the use of the following more soothing and strong restringent forms may have the desired effect:

Take of—Hard sope, thinly sliced, two ounces and a half, dissolve it slowly in a pint and a half of the decoction of the shavings, or of calcined hartshorn, prepared from the same quantity, and as the above;

Tincture of rhubarb, six drachms,

Spirit of nitric ether, or sweet spirit of nitre, one ounce and a half,

Tincture of opium, three drachms; mix and form them into a drink, which may be given every day or two for several times.

The powder directed below, is found preferable and still more powerful in remedying the disease in some cases:

Take of—Gum kino or red restringent gum, in powder, one ounce and a half,

Dried alum, in powder, two ounces and a half,

Hard opium, in powder, two drachms,

Prepared chalk, finely powdered, three ounces,

Root of rhubarb, in powder, three drachms; mix them and form a powder, which may be given in a little warm gruel, as there may be occasion.

These remedies generally put a stop to the very large discharges that occasionally take place in these diseases, and speedily restore the bowels to their sound or healthy state of action.

The free use of milk, in which mutton suet has been boiled, in the quantity of a pound to three or more quarts of the milk, has been found greatly beneficial during the time these remedies are employed. Oil of turpentine has also been used with advantage in this way, and sometimes with oatmeal gruel. After any of which, the condition of the beasts may be much promoted by means of the bark, and the use of other tonic and invigorating kinds of substances.

DYSENTERY OR BLOODY RAY.

This is a still more violent disease of the bowel kind that occasionally attacks cattle, especially when they are in full condition and have been much overdriven; and may be brought on by whatever has a tendency to produce too much action in the system.

The appearances are as follow: there is great looseness and purging, with much severe griping, and a tendency to inflammation; the dungy matter discharged has a very disagreeable smell, it is often blended and combined

with the mucus or material that naturally lines the bowels, and is sometimes intermixed with a sort of skin and bloody greasy substances.

In these cases, the inflammatory state that may be present is first to be removed by proper bleeding, which may be repeated according to the condition of the beasts; and where the discharge continues, some of the more mild of the above remedies may be first used, recurring to the more strong ones in a gradual manner, until the disease be wholly overcome. After which, as great debility must in many cases have taken place, it will be proper to support the animals well by mashes and other suitable means. But in cases where the discharges are large, and have been long continued, the bleeding will be either wholly or for the most part improper; but oily matters may be occasionally useful with the support of good mashes and full doses of opium, and the powder of catechu given in good flour gruel.

In this way most of these severe complaints may be fully overcome in a speedy manner.

PURGING, SCOUR, SKIT, OR DYSENTERY IN CALVES.

There is a disease of this sort to which young calves, from a week or two old to six, eight, or more, are liable, and which is frequently brought on by the change of their natural food. They have, also, in many cases, much too little of their natural food allowed for their proper support and growth at this early age; the deficiency of which is the cause of the destruction of so many calves in different instances. As the altering of the natural manner of feeding these young neat cattle is attended with difficulty and hazard, as little change as possible should be made for the first two or three weeks, allowing them such food mostly pure for that length of time; and then bringing them gradually to the use of different fluids, thickened with meals as a sort of porridge; for, where this precaution is disregarded, purgings and scours will be apt to seize the calves, which not only enfeeble them, but often prove their destruction.

These diseases in these animals are likewise caused by sudden exposure to cold in various ways, by not being kept sufficiently clean in their pens or other places, by licking in any crude indigestible matters that may be within their reach, and in some other methods.

The appearances that denote the presence of the disease, are, great loss of strength and disinclination to motion in the calves; loathing and rejecting their food; an almost constant purging, scouring, and dejection from the bowels of their offensive matters; nearly every thing which is taken in becoming indigestible and running quickly through the animals. When the disease is of some standing, the discharges or scourings occasionally become bloody and fetid, having much of the mucus, which lines the bowels, coming away in mixture with them; there being soon the signs of gangrene or mortification presenting themselves, which speedily put an end to the distresses of the animals. The calves are always very dull and always laying down, not being able to be roused but with difficulty, when they return immediately to the same state.

In the cure of these purgings or scourings in young calves, the remedies must in all cases be properly suited to the ages of them. The means and forms given below may be beneficial in lessening the over action, and restraining the discharges in these states of the bowels, by which the disease may often be overcome in no great length of time.

In mild cases of this nature, the disease may often be removed by such simple means as these:

Take of—Prepared chalk, in powder, half an ounce, boil it in
Milk, thickened with flour, one pint and a half,
Tincture of opium, one drachm and a half,
Compound tincture of cinnamon, two drachms; mix them for a drink.

In cases of young weaning calves, a little of this mixture will mostly prove an useful remedy.

But in other more severe cases, more powerful means may be required:

Take of—Ipecacuanha root, in fine powder, six or eight grains,
Hard opium, fresh powdered, one scruple,
Root of rhubarb, in powder, one drachm and a half,
Subcarbonate of potass, or,
Salt of tartar, two drachms; mix them and make a powder, which may be given in a little gruel as necessary.

This form is for a very young calf, not more than two or three weeks old, and should be increased in the quantities of the ingredients, as the ages of the calves increase. Another form is as below:

Take of—Calcined hartshorn, in fine powder, one ounce and a half,
Prepared chalk, three ounces,
Dried alum, in fine powder, two drachms,
Root of ginger, in powder, one ounce; mix them into a powder, and give it in the quantity of about two large spoonfuls twice a day before the animals are fed, until the discharges are restrained.

Where the bowels require opening remedies, castor oil, in doses of from one to two ounces or more, may be given either alone, or in mixture with other mild laxative substances, with benefit.

In cases where there is great tendency to strain and throw out discharges, almost wholly, in the last or in the end gut of the calves, great benefit may often be gained by the use of the decoction of linseed clysters with the tincture of opium, oil, and cretaceous powder, thrown up as there may be occasion.

CONSTIPATION, OR HARDENED DUNG IN THE BOWELS OF NEAT CATTLE AND CALVES.

There is a constipated state in neat cattle which frequently occurs, and which is often productive of much disease and mischief, as being sometimes the cause of spasmodic pains, colic, or gripes in these animals, and which requires to be removed with speed in order to save the beasts.

It is shewn by a portion of the dung becoming hard and dry, and firmly lodged in some part of the intestinal canal; while a thin liquid part, which is formed, passes off by forcing itself an opening through the hard confined fæces, or along the sides of them. Beasts, in this state, have a full appearance, though they take in but little fodder; they dung in a scanty manner, but frequently; when the liquid part finds the means of being discharged in the above manner, while the hard dry portion remains lodged in its situation.

This is a state of neat cattle that is often met with in connexion with the onset of febrile and other acute disorders; and which greatly endangers the lives of such cattle unless soon removed. It has often the provincial name of *Clue* or *Fardel bound* given it.

The solutions of the sulphates of soda or magnesia, as below, when made with strong infusions or decoctions of good laxative or mild purging leaves and roots, such as those of senna and jalap, in the proportion of two pints of the former to a pint or more of the latter, with a little of the tincture of senna, will be found in common to answer perfectly well, and quickly remove all such dry and hardened collections of dungy matters.

After this has been well effected, the beasts may be restored in their health and condition, by the use of drinks of the strengthening kind.

There is another variety of this sort of complaint, which has much similarity to the above in most of its principal circumstances; and which in some situations is known by the name of *pantas*. It is, however, to be cured by the same sort of remedies and management as the above, and consequently, requires not to be further noticed.

This state or affection of the bowels also occurs in young calves, and often takes place as soon as they are a few days old; but more generally, at the time when they begin to feed upon dry food, as from the age of about seven or eight to ten or twelve weeks. It is a state which in almost every instance is attended with great danger to the animals if not speedily remedied.

But this is, indeed, a state of the bowels which not only calves, but neat cattle of all kinds and descriptions are very subject to whenever affected with internal disease of any sort. It disposes them to attacks of various kinds of disorders of an inflammatory nature, which demand the speedy use of powerful evacuatory means, as neat cattle, of all sorts of live stock, are the most liable to be destroyed by such states, if not quickly relieved by suitable means of this nature.

The diseased condition of the bowels of calves in this case, is marked by the appearance of much fulness and hardness in these parts, and by much straining and difficulty in endeavouring to pass dung, as well as by heat and thirst in some instances.

As the remedies in these cases, with respect to calves, are chiefly of the evacuatory kind, they should constantly be well suited to the age, size, and strength of the calves, as well as to the obstinacy of the constipation which is present; so that neither too little nor too great an evacuatory effect may be produced; as by the former, the necessary relief would not be afforded, while by the latter, the young animals may be too greatly weakened and reduced.

It will be most proper in these cases to begin by the use of the more mild and gentle means of this sort; and where such are not sufficiently effectual in removing the complaint, then to have recourse to those of a more strong and active operation. The forms of some of each of these sorts may be seen below:

Take of—Castor oil, three or four ounces; incorporate it well by rubbing with
Mucilage, then add,
Tincture of rhubarb, half an ounce,
Strong infusion of senna, and caraway seeds, four ounces,
Solution of subcarbonate of potass, two drachms; mix and make a drink, which may be given in a little warm oatmeal gruel as there may be occasion.

The solutions directed below, are more expeditious and active in producing their effects:

Take of—Sulphate of soda or glauber salt, from two to four ounces; dissolve it in a pint and a half of the strong
Decoction of senna and the different cordial seeds,
Tincture of senna, half an ounce,
Syrup of buckthorn, three drachms; mix and make a solution, to be given immediately while just warm. and continued as necessary, or,

Take of—Sulphate of magnesia, or Epsom salt, three or four ounces, dissolve it in a pint and a half of the hot
Infusion of the root of rhubarb, and the leaves of senna, made by infusing half an ounce of the former, and two ounces of the latter, in a quart of water, for some hours, then straining off the clear fluid for the above, use
Tincture of rhubarb, three drachms; mix and form a solution or drink, to be used as the above, and repeated until the bowels are well opened.

These solutions, or drinks, are proper for calves of from about five or six to seven or eight weeks old, but by increasing the propor-

tions of the ingredients, they may be made to suit any age or state.

After the bowels are restored to a proper state of openness, the use of a cordial drink composed of the pounded seeds of anise, caraway, coriander, and some others, with the fresh powdered root of ginger, and grains of paradise, in the quantities of about one ounce of each of the former, and half an ounce of the latter, may be of great utility in restoring the healthy action of the affected parts, and n promoting the growth and condition of the young calves.

AFFECTIONS OF THE LIVER, YELLOWS, OR JAUNDICE.

These are affections or complaints which are frequently met with in neat cattle, and which are generally caused by obstructions in the gall-ducts, or some other parts of the liver, by which the bile is thrown out of its natural course, and taken up and diffused or spread over the whole body, instead of taking its passage into the alimentary canal, where it is designed by nature to aid, correct, and forward digestion, and to keep up the action or motion of the bowels, being of very essential use in the whole process of converting the food into chyle, for the nourishment of the animal.

Where the disease originates in callous hardnesses of the liver, there is the most danger to be apprehended, as but little effectual relief can in such cases be afforded by any means that may be pursued.

The appearance which first marks the presence of the disease is, a yellow tinge visible in the white of the eyes; and as the disease increases, the skin becomes wholly tinged with yellow, but most conspicuously in the ears, eyes, mouths, and tails of the animals. There is great weakness and debility of the whole system, with much listlessness, disinclination to move, and want of appetite for food. The cows which give milk are the most liable to be affected with this disease in the spring, and towards the end of the autumnal season.

As the changeable state of seasons and weather has much effect on the beasts in this state they are probably best housed under all such circumstances.

This disorder is constantly attended with a constipated state of the bowels, and much pain, which shew its difference from cases of indigestion or affections of the stomach.

In the cure it is, therefore, proper and necessary, to keep the bowels of the beasts well open in every stage, as wherever a bound state of them takes place, it is almost constantly productive of much mischief and danger to the animals. This is to be effected by such laxatives as are composed of aloes, in combination with sope and aromatics, or by purgative remedies of the less mild kinds, such as those of aloes, in union with jalap and calomel, the first in the quantity of an ounce or more, the second in that of three drachms or more, and the last in the proportion of about one drachm and a half. Either of these, when made up into balls with the syrup of buckthorn, and given to the beasts in gruel, will generally operate in a short time, and the latter in a pretty effectual manner. Where, however, this is not the case, they may be repeated, the latter in half the quantity, once or twice a day, until the bowels become sufficiently open. Or a strong solution of the sulphate of either soda or magnesia may be used in their stead, in some cases, with a better and more certain effect.

When this open state of the bowels is produced, the following attenuating, dissolving,

and deterging remedies, may be employed with advantage in wholly removing the complaint:

Take of—Hard sope, one ounce and a half, slice and dissolve it over a slow fire, then add,
Subcarbonate of potass, or salt of tartar, one ounce,
Root of turmeric, in powder, two ounces,
——— Rhubarb, in powder, three drachms,
Aromatic cordial seeds of caraway and anise, in powder, each two ounces,
Treacle, sufficient to make them into balls, which may be broken down and given to the beast in a quart of warm beer, and be repeated as there may be occasion.

The form following is still more powerful:

Take of—Venetian sope, one ounce or more, slice and dissolve it over the fire, then add of
Copaiba, six drachms, rubbed well with
Mucilage,
Oak bark, in fine powder, two ounces,
Subcarbonate, or rust of iron, half an ounce,
Compound powder of cinnamon, three drachms,
Honey, as much as is sufficient for making them into balls, which may be reduced and given to the beasts in a proper quantity of warm oatmeal gruel, and repeated every day, or two days, as there may be a necessity.

The use of calomel with a little opium, in the form of a powder, or small ball, has been found very beneficial in some bad cases: the former in the quantity of a drachm or drachm and a half, and the latter in that of a drachm and a half or two drachms, with some sort of aromatic cordial powder. It should be continued for several times, and may be sometimes better when combined with sope and common turpentine.

Bleeding, in these cases, is seldom useful or necessary, except where the beasts are in very high condition.

Where the disease is caused by particular local hardnesses and enlargements in some parts of the liver, its cure must be attempted by such means as are directed below, though such advanced states of the disease are seldom perfectly curable.

There are other tumours and swellings which take place in the livers of neat cattle, and cause great injury and mischief to them, and which sometimes produce the above disease. They arise from all such causes as act on and produce obstruction in the more glandular parts of this organ, such as whatever propels the large mass of blood that passes through it, in an unequal manner on such parts; the action of cold and moisture on the parts, in certain states of them; also accidental blows or bruises on them, and many other causes of a similar nature.

They are, in general, readily discovered and known to be present, by the lumpy hardness that gradually comes on and increases in the parts, and by the enlargement or swelling that afterwards takes place in them. These are in common easily ascertained by the feel with the hand on the part near to which the liver is situated in the beast, if not by the enlarged appearance of the part, as is very usually the case.

In the removal of such local tumours and swellings, the use of calomel, with purgative substances, such as described below, and frequent strong mercurial frictions, as nearly on the parts affected as possible, the hair being first removed, will, in most cases, be found highly beneficial in reducing, and finally removing such glandular swellings. The cure may afterwards be completed, by having recourse to saponaceous remedies, with bark in full quantities, as there may be occasion.

Take of—Submuriate of mercury, one drachm and a half,
Aloes, in powder, half an ounce,
Root of jalap, in powder, two drachms and a half,
Sulphurated oil, sufficient to make them into a ball, which may be given every morning for several times, in a hornful of warm gruel. The frictions are best made by the use of a mixture of two parts of the strong ointment of the mercurial kind, with one of soft sope, rubbing it well in upon the parts near to the tumours.

BLOODY URINE, RED OR BLACK WATER.

This disease takes place among all sorts of neat cattle stock, but is more prevalent and general in cows that give milk, than those of any other description. The latter of these appearances, or black water, seems to indicate an increased state of the disease, which often proves fatal, when not attended to or well managed.

The causes which induce this disease are, commonly, those of the beasts taking cold on being put into low, wet, pasture lands, on first turning them out in the spring; the too frequent change of pasture, and sudden alterations of the weather; the deficiency or badness of the water which they drink, in long-continued, hot, dry seasons; and some others of the same kind. The disease may also arise from external injuries, in some cases, as from severe bruises, by blows and other accidents, on the parts, and by the loins being much strained and hurt by the riding of other beasts upon them. Though the disease may in different instances be produced by all or most of these causes, there can be no doubt, that some beasts are much more disposed and liable to be affected with it than others. It is, indeed, asserted by some, that beasts have been known to be affected in this way, once or oftener annually, for two or three such periods in succession, and ultimately to have bled to death, setting all the powers of the practitioner and other means wholly at defiance.

As the disease changes or alters from the former to the latter state or appearance, the beasts often pass water, which is free from either of the characteristic appearances of the complaint at different times; and in cases where the disease is but slight in its nature, the beasts scarcely appear to be in any way affected by the discharge of blood, which is mixed and passed off with the urine. Nor is the secretion of milk disturbed by it, in the case of cows, as the usual quantity is generally kept up, and they do not seem to be hurt by it. Where, however, the blood mixed and passed off in this manner, is large in quantity, and of long continuance, it not only almost always lessens the secretion of milk, in regard to quantity, but also brings the beasts to a very low state of condition.

The indications of this disease are as follow: the beasts have, for a short time before the state of the urine shows the disorder, a sort of sinking in the eyes; they are dull and listless, and their appetite fails; the nose is without the healthy coolness and moisture by which it is usually distinguished, it being hot and dry, and the coat is hard and constricted; their urine then becomes of a bloody red or purplish colour, as if mixed; it again becomes clear, or nearly so, for a day or two, and afterwards, if not restrained, it takes on a darker purple or black colour, which marks its more advanced state, and the greater injury of the affected parts.

This last colour goes on deepening until ultimately it becomes of a fouled, muddy, dark cast, at which time a rapid sinking and decrease takes place in the strength of the beasts, and in a few days, if proper means of relief be not used, they generally perish.

It is evident, therefore, that the disease, in the latter states of it, must be speedily removed by proper remedies, or the destruction of the animals, by its powerful debilitating effects, will take place.

The disease is almost invariably unattended by the difficulty and frequency of passing the urine that usually attends an inflamed state of the kidneys, which circumstance may serve to distinguish it from that complaint.

In these cases, as much blood is usually passed

with the urine, general bleeding will rarely if ever be necessary, but topical bleeding, as near the parts affected as possible, may often be highly beneficial. After which, the use of the following means may be had recourse to. As great injury and risk to the beasts are often caused by a constricted and bound state of the bowels, to which there is a constant tendency in all these cases, they should always be kept well open by means of sufficiently strong solutions of the sulphates of soda or magnesia. Six or eight ounces or more of either of them may be given, according to the state and condition of the beasts, dissolved in a pint or more of the warm infusion of senna, adding a few ounces of coarse sugar or treacle, so as to make a drink; which may be repeated as often as necessary for preserving an open state of the intestines, during the use of the remedies directed below; or castor oil, in the quantity of eight or ten ounces, may sometimes more conveniently serve the same purpose equally well.

Take of—Dried alum, in powder, two ounces,
Nitrate of potass, or,
Nitre, in powder, one ounce and a half,
Sulphate of iron, or,
Salt of steel, in powder, two drachms,
Catechu, in powder, two drachms and a half,
Acacia, or,
Gum arabic, in powder, four ounces; mix them and make a powder, which may be given in oatmeal gruel a little warm, and may be continued as occasion may require.

The form given below is more powerfully effectual in some cases:

Take of—Sulphuric acid, or,
Strong oil of vitriol, one drachm and a half or two drachms,
Oil of turpentine, half an ounce, very slowly united with the acid,
Tincture of opium, three drachms,
——— myrrh, two drachms; mix them and let the beast have the whole in a proper quantity of gruel, repeating it as necessary.

The use of many other substances with the above laxatives, such as dragons' blood and gum kino, in fine powder, with a little powdered hard opium and nitre, have been found very beneficial in some cases, as well as lime water and the tincture of the blistering fly in full doses; and the white-blossomed nettle juice has been used, in the quantity of half a pint, with success.

All these remedies should be given to the beasts on as empty a stomach as possible; but as they rarely fall off wholly in their appetites for food, none or very little attention in that way is necessary, except to restrain them from such as are too rank and otherwise improper.

Where the disease arises in consequence of bruises or strains in the loins, which is shewn by the tenderness and shrinking of the beasts on being pressed on such parts, and by a stiffness in moving the hind legs; local bleeding, as near the parts as possible, may sometimes be useful; after which, camphorated, saturnine, saponaceous applications of the wash kind, with the tincture of opium, or hot vinegar fomentations, may be well rubbed and applied upon the parts, which should be covered, several times in the day; and mild turpentine remedies with a little opium in the liquid form should sometimes be given internally in rather small doses. Should the inflammation, however, rise high, and be attended with fever, it will require a more evacuatory, and quite a different, plan of management, somewhat like that recommended in diseases of the *kidneys and bladder*.

In case there be ineffectual efforts to void urine displayed by the beasts, and it be only passed in a small or dropping manner, with great pain and difficulty, those means which force urine are hurtful, and should be left off, large quantities of mild sheathing substances being used in their stead.

STRANGURY AND SUPPRESSION OF URINE.

This is a disease which consists of a partial suppression of urine, but at the same time unaccompanied with fever or other general symptoms. In these states there are frequent attempts made to pass urine without voiding any, or else in very small quantity, and sometimes in a dropping manner. There is often much pain and uneasiness in the parts; and the disease is mostly the effect of some irritation, occasioning a loss of mucus in the parts, and a sort of spasmodic contraction about the neck of the bladder, but is sometimes caused by costiveness, when it is very considerable. When it occurs in beasts which are not with calf, it may be removed by such means as these:

Take of—Nitrate of potass, in powder, one ounce and a half, dissolve it in

Spirit of nitric ether, one ounce,

Tincture of opium, half an ounce; oatmeal gruel, one pint; mix and give it in a quart of linseed tea, and repeat it as occasion may require. Oily clysters should likewise be frequently used, and the bowels be well kept open.

Where there is much suppression of urine, camphor, in the quantity of two or three drachms, may be dissolved in a larger quantity of the spirit in the above mixture, and given with much advantage.

POISONS TAKEN INTERNALLY.

Accidents of this nature arise in different ways in neat cattle: such as from the eating of some sort of deleterious or noxious herb, plant, or vegetable; the cropping of some particular kinds of trees, as those of the yew, and some other sorts; the drinking of stagnant waters which are loaded with different matters that are supposed to be poisonous; and from the taking up in feeding some other poisonous substances or materials.

In whatever way the beast has received or taken in such poisons, the appearances which are produced are those of a violent pain and heat with great uneasiness at the stomach; the frequent swelling of the body of the beast to a very large size, with great tightness in the parts, and a degree of giddiness and stupidity in the look of the animal. Where the poisonous matter, in whatever way it may have been taken into the stomach, is permitted to continue there without being counteracted, expelled, or destroyed by proper remedies for the purpose, it almost always causes death in a short time; and of course, therefore, where animals are affected in this way, they stand in need of the most speedy means of relief and assistance. In cases where they begin to swell in a rapid manner, a puncture has sometimes been made with a sharp penknife into the paunch of the animal in the same place and direction as described in speaking of *hoven* or *blown* beasts; which, it is asserted, has instantly discharged the distending confined air, and produced great ease and relief, especially where the poisonous matter producing the disease was of the vegetable kind. This mode of relief is always to be avoided, however, if possible, as hazardous, uncertain, and disagreeable in its nature and consequences.

In all cases of this sort, the causes of the mischief are to be removed as soon as possible by such means as are described below; the bowels should be speedily well opened by a strong purging solution of the sulphate of soda or glauber salt, in boiling water; but sometimes six, eight, or ten ounces of castor oil. with some salt of tartar dissolved in it, is found to answer better in carrying off the acrid contents, and relieving the uneasy fulness of the stomach and bowels.

At the same time, the noxious effects of the

poisonous matters may be corrected by the use of such compositions as these:

Take of—Subcarbonate of potass, or salt of tartar, one ounce and a half,

Subcarbonate of ammonia, two drachms,

Tartrate of potass, or soluble tartar, two ounces; mix and form them into a powder, which may be given in a pint and a half of thin warm gruel, as there may be necessity.

Where the beasts are in high condition, a little blood may be taken away sometimes with advantage; and the health and strength of the beasts should afterwards be restored by the use of strong stimulating cordial drinks.

IRRITATION IN THE URINARY PASSAGE AND SHAPE.

This is a state which frequently takes place among the younger sorts of the cow and heifer kind, and more generally about the time of taking the bull in them, being the effect of great local heat and irritation in such parts, arising from the sharp saline state of the urine and the too great loss or discharge of mucus from the linings of these passages.

It usually makes its appearance at hot seasons in the form of large pimples on the parts, which itch greatly, break, and sometimes let out much acrid, thin, watery contents, that cause great irritation, pain, and uneasiness, with occasional outward swelling, the beasts frisking about and rubbing their hind parts on any thing that comes in their way.

In the removal of this disease, cooling, opening, demulcent, moderately diuretic remedies, such as those below, may sometimes be necessary, and may prove effectual in most cases without the necessity of bleeding, which should be avoided as much as possible:

Take of—Supertartrate of potass, or cream of tartar, two ounces and a half,

Nitrate of potass, or nitre, in powder, one ounce and a half,

Gum tragacanth, in powder, three ounces,

Leaves of senna, in powder, one ounce; mix them and make a powder, which may be given in a hornful or two of gruel, and may be repeated as often as may be necessary. Or sometimes,

Take of—Common, Castile, or Venetian sope, one ounce and a half, sliced, and gently dissolved over the fire,

Subcarbonate of potass, or salt of tartar, one ounce,

Root of jalap, in powder, three drachms.

Juniper berries, in powder, two drachms,

Copaiba, as much as is sufficient to make them into a large ball, which may be broken down, mixed with a proper quantity of oatmeal gruel, or linseed infusion, and given to the beasts as occasion requires. The beasts should have plenty of water, with meal or bran in it, frequently given them during the use of these remedies.

CONSTRICTION OF THE SKIN, OR HIDE-BOUND.

This is a diseased state of the skin, which is common among neat cattle that are badly fed and ill taken care of in other respects. The whole body is probably much reduced in strength from the insufficiency of food, but the skin is most particularly affected, as is seen by its remarkable appearance. The beast has no disposition to improve in condition, but is fond of rubbing itself against hard bodies.

There is a tightness, hardness, and constriction of the whole skin, which sticks close to the body without being capable of being raised up by the hand, as is usual, with a stiffness and standing up of the hair, the coat having a considerable degree of dustiness and scurfiness in it.

All these appearances plainly indicate the weak impoverished state of the animal, and that the disease originates wholly in the want of full and proper support. The means directed below, with a good pasture or fodder in the house, will therefore soon set the beast to rights:

Take of—Submuriate of mercury, one drachm.

Sublimed sulphur, two ounces

Ginger, in powder, half an ounce; mix and form a powder, which may be given in a hornful of warm ale in the morning.

The strength of the beast may be wholly recovered, when worth it, by the use of the following after a few days:

Take of—Oak bark, three ounces,
Subcarbonate, or
Rust of iron, one ounce and a half,
Elecampane, in powder, one ounce and a half,
Caraway seeds, in powder, two ounces; mix them into a powder, and give it to the beast in a proper quantity of thin gruel, as necessary.

A good pasture, especially if of the salt-marsh kind, in general, readily restores beasts who have had this disease.

SCABBY KNOTTINESS IN THE HIDE OR SURFEIT.

This is a disorder that occasionally takes place in neat cattle which are kept in a stinted manner and upon inferior kinds of fodder, whether in the pastures, farm buildings, or yards. It arises from a bad and greatly debilitated habit of body, which shews itself by such scabby and small knotty appearances in the skin. It is most common in the cold seasons of the year.

The scabs are small and creeping in different parts of the body, sometimes of an acrid and rather moist kind, but at others of a quite dry scaly quality; the knots are small and feel like little marbles in the glands of different parts of the skins. The beast appears dull and lifeless, and has little inclination for food, whether in the field or the stall.

The first thing to be done in all these sorts of cases is to restore the beasts to better keep; after which, their condition and the diseased states of the hides may be further improved and remedied by the use of such means as the following:

Take of—Submuriate of mercury, or calomel, two scruples and a half,
Sulphuret of antimony, in fine powder, one ounce,
Nitrate of potass, or nitre, in powder, half an ounce,
Sublimed sulphur, one ounce,
Leaves of senna, in powder, six drachms,
Root of ginger and gentian, in powder, of each an ounce; mix them well into a powder, which should be given in the evening in a quantity of thick warm gruel, a pint of warm beer being thrown into the stomach immediately afterwards.

The moist scabby parts which are broken out, if clear of the hair, may be well washed and kept wet with an application of the following kind:

Take of—Strong sope lees, a pint and a half,
Spirit of camphor, or camphorated spirit of wine, three ounces,
Tincture of opium, two ounces; mix and make a wash for the above use.

Very hot lees, used alone, have been found greatly beneficial in rendering the parts clean, and in promoting their skinning over.

The use of soft sope in washing them would probably answer the same purpose, and is known to be very efficacious in washing the dry scabs.

WARTY EXCRESCENCES OR ANGLEBERRIES.

These are hard or rough lumpy enlargements of different sizes which grow out from the skin, standing or hanging above or from it, and which have a great degree of unpleasantness in their appearance. They are most usually met with in young cow stock, especially those with their earliest calves; and they appear in different parts of the bodies of the animals, but most commonly under the bellies and on or about the udders. When in the latter situations, they are not only disgusting in their appearance, but occasion much trouble in milking. They have for their basis small

necks, from which they hang in a downward manner.

In the removal of such hard or jagged excrescent bodies, different methods are followed. They are sometimes taken off simply by tying a cord, platted hair, or waxed end, round the necks or base parts of them in a tight manner, letting them remain until the excrescence falls off. It is preferable, however, to let the ligature be so tied as that it can be tightened as there may be occasion, by which means the desired effect will be much sooner and with less difficulty produced. Another method is to pass a strong small cord-like ligature close round the bottom parts of the bases of the warts, and then to cut them off with a sharp knife; and wet the parts over with sulphuric acid, or some other liquid caustic substance, in order to destroy any remaining parts, and at the same time to produce a sort of sloughing and ready healing of them. A still more ready and effectual method is sometimes though rarely had recourse to, which is that of having the animals cast, and then fixing on the neck parts of the excrescences, to be removed, close at their bottoms, a flat instrument made for that purpose, and then by means of a proper hot iron burning them off, carefully wetting and touching all the parts acted on by the iron with some such fluid caustic material as described above, in order to destroy any root fibres that may remain, and to produce the same healing effect. When taken in their early state, before they come to any size, these warts may often be removed in an easy manner by the frequent application of a strong astringent composition of the kind directed below:

Take of—Sulphate of iron, or green vitriol, one ounce and a half,

——— copper, or blue vitriol, one ounce,

Dried alum, in powder, half an ounce,

Superacetate of lead, or sugar of lead, three drachms,

Ointment of spermaceti, six ounces, mix and rub them well together, so as to form an ointment, a little of which is to be well rubbed on the parts twice a day. In such cases this ointment often gradually reduces and destroys these excrescences without hurting the neighbouring parts.

Warts and warty excrescences may also be greatly assisted in their removal by first thoroughly washing them and the parts on which they rise with soft sope and warm water, in whatever situation they are; and then applying the above, or some such ointment to them in a small quantity at a time, but frequently.

ITCHY OOZING SORES IN THE SKIN, SCAB, OR MANGE.

This is an affection of the skin which is well known, and which is generally a consequence of poorness and shortness of keep. It most usually shews itself in the early spring, as the season becomes warm, but takes place at almost all times of the year.

It appears by the hide of the beast sticking close to the flesh over the whole body, and resisting all attempts to raise it by the hand, as in ordinary cases; by the hair coming off, whenever the beast rubs itself, which it does frequently; by a thick white scabby scurfy state of the skin, which has a moist appearance; and by great itching, which is evinced by the actions of the beast, which becomes restless and uneasy, and has no inclination to feed.

In this disease of the skin, applications of the sulphur kind, with other suitable materials, are principally to be depended upon, as mercurial substances cannot be made use of in consequence of the impossibility of guarding against the danger of the cattle licking themselves under such circumstances. The following form may often answer very well, but it may be varied as circumstances require:

Take of—Sublimed sulphur, or of sulphur vivum, six ounces,
Root of white hellebore, in fine powder, four ounces,
Soft sope and hogs'-lard, of each ten ounces,
Oil of turpentine, three ounces; rub them well together into a smooth ointment, by adding a little common olive oil.

All the diseased parts of the skin should be well rubbed over with this application, at a very few days' intervals for several times, but in some slight cases the use of it once in a full manner may be sufficient.

In some bad cases, it may be useful to have recourse to sulphur and antimony, which may be given internally in the quantities of from two to three or more ounces of the former, and from half an ounce to one ounce or more of the latter, for a few times, which will greatly assist in speedily removing the disease.

HARD SMALL TUMOURS IN THE SKIN, OR WARBLES.

These are little tumours or swellings that frequently take place under the skin in neat cattle, proceeding from the punctures of a fly, which is usually known by the name of the ox-fly, by which small holes are formed in the backs of the animals, in which the ova or eggs of the fly are deposited. These eggs are soon hatched or brought into life, and a small tumour or swelling arises in consequence, which has a grub formed in it; a small hole or breathing pore is made in the middle of the tumour which also serves as a discharge for the unnecessary matter produced, which otherwise might induce suppuration, and cause the destruction of the grub.

One method of curing these hard lumpy tumours in neat cattle, is by displacing the grubs from their situations, by the pressure of the thumbs or fingers and thumb on the different sides of the tumours so as to force them out. But a better and more easy way of removing such tumours, is, perhaps, by the destruction of the grubs contained in them, by stopping up the breathing pores in the little tumours, by the use of thick mucilaginous oils; such as those of the boiled oil of linseed and some other vegetables as well as animal substances. The scabby crusts usually covering the pores or holes in the little lumps are to be removed, and the oil put in until the holes are quite full, repeating the operation in a day or two if necessary. A few drops of oil of turpentine, also, answer well applied in this way; or a solution of the oxymuriate of mercury in weak spirit, might probably succeed better still in destroying these grubs.

VERMIN IN THE SKIN, OR LICE.

These vermin are generally to be seen on the skins of beasts by moving the hair on them. They particularly infest such neat cattle stock as are lean and poor in condition, as the old coats of the animals not being well thrown off, additional harbour or covering is provided for them, in which, from the increased heat and other causes, they rapidly generate, and multiply in great abundance.

These lice are very troublesome to the animals by the itching and other effects which they produce, keeping the beasts from feeding and thriving, and should therefore always be destroyed or removed as soon as possible. Various strong poisonous substances would speedily effect that purpose, but they cannot be safely employed on account of the licking of the animals, which nothing can prevent; otherwise the different oxides or calces of mercury, and other matters of a similar quality, might be used with the best success. In the place of these, therefore, an application of the kind directed below, should be well rubbed on the different places where the vermin are

present, for two or three times, which will generally be sufficient to destroy them:

Take of—Root of staves-acre, in fine powder, six ounces,
White hellebore root, in powder, four ounces,
Spermaceti ointment, one pound, rub them well together on a slab, then add,
Oil of turpentine and sulphuric acid, three ounces of the former, and half an ounce of the latter, slowly and gradually incorporated,
Common olive oil, sufficient to rub the whole into a smooth soft ointment.

The beast in these cases, should have good keep, whether in the field or the house, and occasionally a nourishing drink or two of the cordial strengthening sort, will be useful and indeed necessary.

BITES AND STINGS OF VENOMOUS REPTILES AND INSECTS.

There are but few animals of these kinds in this country which are hurtful to neat cattle; yet the bite of the viper or adder, and the stings of different insects are sometimes troublesome and dangerous, as they are more liable to be hurt by them than any other sort of live stock. Instances have indeed occurred, though rarely, in which the tongues of cattle, whilst employed in licking in the food in pasturing, have been so badly stung as to bring on a state which has terminated fatally.

The first sort of these reptiles seldom injure this sort of cattle, unless when they are obstructed or disturbed by the beasts when taking their pasture, as is evident from the circumstances of almost all such bites taking place about their heads or feet.

There is in some cases considerable pain, inflammation, and swelling produced by the stings of insects, such as the wasp, bee, hornet, and some others, in all of which the same means are to be used in order to the removal of the affections.

The use of such an application as that given below, may be beneficial in lessening the acrid irritation, and removing the inflammation and swelling caused by it in such cases:

Take of—Solution of subcarbonate of ammonia, or
Strong spirit of hartshorn, three ounces,
Oil of turpentine, two ounces,
Compound sope liniment, or
Opodeldoc, two ounces and a half,
Tincture of opium, two ounces,
Common olive oil, two ounces and a half; mix them for an embrocation, a little of which is to be well rubbed over the parts bitten or stung, several times in the day, until the pain and swelling abate.

In bad cases, some persons employ fomentations of narcotic emollient vegetable substances, made with acid beer-grounds; but these are improper, especially when used hot. Cold applications, such as the above, and those of the strong vegetable acid kind, with opium and camphorated spirit, promise more benefit in these cases.

LAMENESS OR SLIP IN THE SHOULDER JOINT.

The ends of the bones which constitute this joint in neat cattle, are liable to be often displaced or slipped, as it is called, causing great lameness, pain, and uneasiness to the animal. It arises from various accidents, as slipping in frosty and other kinds of weather, riding upon other beasts, and many other such causes.

Applications of different kinds are often made use of in these cases; but a mixture of the following oily substances is often very efficient without the assistance of any other means:

Take of—Oil of turpentine, two ounces and a half,
Oil of origanum, or,
Wild thyme, one ounce or more,
Tincture of opium, half an ounce,
Solution of subcarbonate of ammonia, or,
Spirit of ammoniac, six drachms; mix them well by shaking, and then rub a little on the lame part, once or oftener in the day.

KNOTTY STIFFNESS OF THE JOINTS.

This is a diseased state in cattle, which is commonly the consequence of their being badly kept and much exposed to cold, proceeding in most cases from an ill condition of the body of the animal.

Under the influence of this complaint, the beast is seized with a rigidness in such parts, on which small knots or knobs shew themselves, which soon become foul and weeping sores, similar to those in the farcy in horses. There is often much itching and pain in the parts, and the animals become much reduced if the disease be of any continuance.

The following has been found useful in these cases:

Take of—Submuriate of mercury, or,
Calomel, one drachm,
Guaiacum resin, in powder, one ounce and a half,
Hard opium, in fresh powder, a drachm and a half,
Black sulphuret of mercury, six drachms,
Ginger, in powder, half an ounce,
Sulphurated oil, as much as is sufficient to make the ingredients into two balls, which are to be given in a pint and a half of warm ale as occasion may require.

The beast should be put in a good pasture, or have good keep in the house in this state of disease.

PAIN AND RIGIDITY IN THE JOINTS.

This state has some resemblance to the above affection in several points, though it differs materially from it in others. It sometimes arises in consequence of local weakness; but more frequently from the action of cold in severe stormy weather, when the beasts are greatly exposed whilst feeding in high, bleak, unsheltered situations. There are, also, other causes of a similar nature which tend to produce this disease.

The indications of the complaint are, a great pain and stiffness in the joints of the beasts, with a degree of lameness in some cases, but without any knotty breakings-out. There is much inaction and total disinclination to feeding in the animals, and they consequently decline in their general state of body.

In recent cases of this sort, the complaint may be readily removed by the use of the remedy directed in the above disease; but if it should have been of long duration, the following means, and those employed in the rheumatic state of such parts, should be had recourse to, in order to its perfect removal. The complaint is sometimes known in the country by the name of the *Wod Evil.*

WEAKNESS OR LOOSENESS IN DIFFERENT PARTS, OR TAIL ROT.

This is a diseased state of some of the joints of neat cattle, that usually happens to them when under an impoverished condition from want of proper keep.

The beasts, under this disease, droop and drag slowly about by themselves, feed in a very sparing manner, become thinner and weaker daily; the skin becomes contracted and shrivelled up, and soon becomes very stiff and rigid; the coat then stands an end, especially about the neck and shoulders, much scurfy or scaly matter of a yellowish colour is harboured in it; the teeth on examination are found loose; and the tail very weak and loose in the articulating parts, being tinged with the above yellow cast. This disease is sometimes termed *Joint Yellows.*

From the slow, lingering, and debilitating nature of the disease, it is particularly necessary to attend to it in its early state before the beasts become too much reduced to allow any hopes of cure.

Such remedies as the following have been found useful in these cases:

Take of—Oxide of antimony, one ounce and a half,
Subcarbonate, or,
Rust of iron, in fine powder, two ounces,
Sublimed sulphur, three ounces, and a half,
Root of Gentian, in powder, one ounce and a half; mix them into a powder, and give it to the beast at intervals of a day or two, for two or three times or more in a proper quantity of warm beer.

In some cases the following answers better:

Take of—Nitrate of potass, or,
Common nitre, in powder, one ounce and a half,
Oak bark, in fine powder, four ounces,
Precipitated sulphur, one ounce and a half,
Root of turmeric, in powder, one ounce,
Powdered grains of paradise, six drachms; mix them, and give the powder daily to the beasts in warm ale for some days.

The animals should be well kept in the field or house under this state of disease.

Though bleeding is by some advised, it can evidently be rarely, if ever, admitted in any of the states of this form of the disorder.

INFLAMMATORY AFFECTION OF THE JOINTS, WHITE WATER, OR LONGSUFF, &c.

In these affections, which are nearly related in their nature to that just described, and which are probably only increased states of the same disease, the neat cattle are severely attacked and harassed in many instances.

The appearances are, that the beasts rise up with much difficulty, walk in a very stiff manner, and appear sore on the backs on being pressed: the knees, hocks, and other joints and parts, are so painfully affected, that the animals can hardly crawl along, and cannot be said to walk. All the joints of the affected animal have the mucous fluid with which they are filled, of a deep yellow cast, with great pain, stiffness, and lameness in them; and it may, therefore, be said, that this affection is the complete state of *joint yellows*. The teats in cows are liable to have the milk affected in the same way, and require to be milked frequently, in order to prevent mischief to the udder. In the more early state of the complaint, the beasts are sometimes occasionally very hot, then cold with shiverings, and a sort of feverish state. Spasmodic contractions, and workings in the muscles of different parts, especially in the flanks, are frequent; and the pulse is strong, with great action of the lungs.

In the cure of these cases, bleeding, in some states of them, may be useful and necessary, but it should always be employed with great caution, as there is, in general, great tendency to weakness. The bowels should, however, be well opened by the sulphate of magnesia or Epsom salt, in solution in boiling water. After which, one of the following remedies may be tried:

Take of—Subcarbonate of potass, or salt of tartar, six drachms,
Nitrate of potass, or common nitre, in powder, one ounce and a half,
Snake root, in powder, three drachms; mix them into a powder, and give it in some warm liquid once a day for several times; or the following may be more beneficial in some instances:

Take of—Oxide of antimony, in fine powder, one ounce,
Nitrate of potass, or common nitre, in powder, one ounce and a half,
Sublimed sulphur, one ounce,
Contrajerva root, in powder, six drachms; mix them and form a powder, which is to be given in the same manner as the above.

When the beasts reject their food, they should be kept in the house, and have good soaked substances, as lickings, given them, which greatly assist in the removal of such affections.

RHEUMATIC AFFECTIONS OF THE JOINTS.

This diseased state of the joints principally occurs in young neat cattle stock, and in such cows as are in milk, and generally comes on at

the spring of the year, when the weather is cold. It commonly arises in consequence of the beasts having been kept in a low starving condition through the winter months, and then being turned out in a sudden manner into situations exposed to the piercing northerly winds. Other causes also produce it, such as damps, or standing too much in cold waters. It is often provincially termed *joint fellon.*

The appearances that mark the presence of this disease are as follows: for a short time, on its first attack, the joints of the beasts seem only stiff; soon afterwards, however, they begin to swell and enlarge, without any appearance of inflammation, and a cold indolent sort of tumefaction arises in them, which is attended with a stiffness and rigidity, that often spreads over the whole body in so considerable a manner, as to render the beasts incapable of rising without help. In this state the animals suffer greatly, on account of the severity of the pain in the parts, and from their incapability to move about. There is rarely, if ever, any active feverish state in these cases, but a sort of lowness and weakness; the whole body appearing to be seized with languidness and want of power of exertion.

There is a lameness in the joints of cows, which sometimes shows itself in those of the fore parts, and at others in those of the hind, being accompanied with great pain and uneasiness; and which is frequently the consequence of hard driving in a weak state.

With a view to the cure of this disease, the beasts should be put into more warm situations, in the house or field, as warmth greatly promotes and assists the removal of such affections. A degree of new action and exertion is then to be excited in the system, by the use of such means as the following:

Take of—Guaiacum gum resin, in fine powder, one ounce,
Camphor, rubbed fine, two drachms and a half,
Submuriate of mercury, one drachm,
Hard opium, fresh powdered, one drachm and a half,
Powdered ginger, half an ounce,
Sulphurated oil, sufficient to make them into a ball, which may be given to the beasts in a handful or two of warm ale in the evening, and as often as necessary.

It has been recommended to rub all the affected parts with the following sort of application:

Take of—Spirit of camphor, four ounces,
Oil of turpentine, two ounces.
Solution of subcarbonate of ammonia, one ounce and a half,
Oil of origanum, or
Wild thyme, one ounce,
Tincture of opium, one ounce and a half,
Common olive oil, six ounces; mix them well by shaking them in a bottle, and let them be well used on the swellings once or oftener in the day. They are often beneficial in removing the puffiness of these sorts of swellings, while they lessen the rigidity of the parts.

Cordial drinks are also often given, but they have little effect in cases of this sort.

It occasionally happens, from the influence of particular causes, that this passive state is converted into that of the active or acute kind, which is attended with high fever, great pain, and inflammatory swellings in the joint parts.

In these cases, recourse must be had to opening remedies, such as the sulphates of soda or magnesia, dissolved in the quantities of six or eight ounces in strong infusion of senna; after which such a form as the following may be usefully given, according to circumstances:

Take of—Tartarized antimony, two scruples,
Subcarbonate of ammonia, in powder, two drachms,
Camphor, well rubbed down, three drachms,
Hard opium, in fresh powder, half a drachm,
Root of contrajerva, in powder, six drachms; mix them well, and give the powder in a little warm gruel.

As soon as the feverish state begins to abate by such means, the free use of oak or other bark, and tonic substances of different kinds, may be beneficially thrown in, so as completely to restore the animals.

Almost all the diseases of neat cattle which are brought on by cold and exposure, have, in the rural language of districts, the term *Fellon* applied to them, in different ways, but which term is of very little use in distinguishing the nature of such affections, or the modes of their cure.

ULCERATING ABSCESSES, OR FOUL IN THE FEET.

This is a common disease in the feet of neat cattle of all sorts, and at all periods of their ages; but such of the cow kind as are in a full, though bad infirm state or condition of body, are probably the most subject to it, and suffer the most severely from it. In these affections, the pain and corroding action in the parts are often so great and distressing as to weaken the beasts in a high degree, and to reduce them considerably in their flesh, especially if it continue long. There seem to be two different kinds or states of this disease, as they affect different parts of the feet; each of which requires a somewhat different sort of treatment in their cure.

The appearances of these complaints, as they shew themselves in their different situations and states, are such as the following: where they are seated in the horny parts, they generally first appear in the form of hard dry cracks, between the claws of the hoofs of the feet, which have much inflammatory action, and in a little time begin to discharge a fetid very offensive thin sanies, that in some degree resembles that of the grease in the heels of horses, but which is not quite so thin. This discharge sometimes continues increasing in virulence until wholly removed, while at others it remains in nearly the same state for a length of time. The beasts in common are affected with lameness before such appearances take place. When the situation of them is about the rings of hair that surround the hooves, as between the former and the latter, they are shown in the form of a sort of bumps or swellings, of no very great size, on the confines of such parts, which are attended with much pain and inflammation, by which suppuration and the formation of matter are not unusually produced. In such cases, the claws of the hooves, when the swellings are large, and seated nearly between their divisions, are forced out much wider than usual, and the swellings break out, when left to themselves, and discharge their contents.

In the removal of these abscesses, when seated between the claws of the feet, before any thing else is done, the parts should be well cleaned from all sorts of dirt and foulness: they should then be dressed in every part with muriatic acid, or butter of antimony, sulphuric acid, or some other such caustic fluid substances, applied by the means of a small wooden piece of stick. This should be done once daily for several times, until the whole of the sores thus touched be made to slough away and become in a healing state. In case a sharp corroding matter be contained in the small swellings, they may be opened by a lancet, and be then dressed in the same manner; or in some instances they may be poulticed and allowed to suppurate and burst, being afterwards dressed in a similar manner.

When, however, they are situated near the circles between the hair and the hooves of the feet of the animals, and are swelled much and greatly inflamed, an ointment, composed of

camphor dissolved in the oil of turpentine, in the proportion of about six drachms of the former to three ounces of the latter, working them up with six ounces of elder ointment and an ounce of common turpentine, should be applied in the first instance, by being rubbed well on them for some time; and afterwards close-sticking poultices of tar, rosin, or other adhesive kinds of materials, in combination with different sorts of meals, should be immediately laid over them. When the matter is perfectly formed, it may be let out in the above manner, when it does not cause an opening for itself, and the parts be then dressed with the detergent mixture directed below, by means of dossils of lint being moistened with it and laid to them, continuing the applications until the parts become restored to their natural state and condition, when the following mixture may be used for completing the cure:

Take of—Oil of turpentine, one ounce and a half,
Compound tincture of benzoin, two ounces,
Muriatic acid, or spirit of salt, three drachms,
Liniment of verdigris, three ounces; form them into a mixture for the above use.

This mixture may be rendered stronger, when necessary, by dissolving in it suitable quantities of alum, blue vitriol, or oxymuriate of mercury.

In the last or worst stage of the nauseous foul, the disease can only be removed by making incisions, and applying a liniment and poultice of the following forms:

Take of—Camphor, one ounce, dissolve it in
Oil of turpentine, four ounces,
Oil of bays, three ounces,
Marshmallow ointment, four ounces; well mixed together for use.

Take of—Tar, one pound, melt it over a slow fire, and then add
Linseed, in powder, eight ounces; mix and, when milk-warm, apply it to the affected parts as often as necessary.

Some persons advise a water of the following kind for the foul in the feet: a strong solution of sulphate of copper or blue vitriol in that fluid, and when required to be very powerful, sulphuric acid and oxymuriate of mercury, or corrosive sublimate, may be added.

Or an ointment made of the above, mixed with honey and verdigris, may be applied on pledgets of tow to the parts as there may be occasion.

INFLAMMATION AND ABRASION OF PARTS, OR BULL-BURNT.

In these cases both the sheaths and pizzles of the animals are sometimes affected; the former becoming foul and infested with sharp corroding sores, which cause it to swell, and the latter to be of course inflamed and abraded in different places, which is sometimes much increased by over-riding by the beasts. It is, indeed, in some instances, so much swelled by such causes as to prevent its returning into the sheath.

The removal of such affections of these parts may in some cases be readily accomplished simply by washing them well with a solution of muriate of ammonia or sal ammoniac in cold water, and cold diluted solution of subacetate of lead or goulard water, mixed in equal quantities. But in some cases they require to be examined and well cleaned by the use of soft sope and warm water, when a wash of the following kind may be applied with great effect:

Take of—Sulphate of zinc, or white vitriol, three drachms,
Superacetate of lead, or sugar of lead, half an ounce, dissolve them in two pints of rain-water, and add
Tincture of opium, two drachms; make a wash, a little of which should be used in such washing every few days, (the animal not being suffered to ride during the time,) taking good care that every part be effectually made wet and clean on each application.

In bad cases the following ball may be given at the same time with great benefit:

Take of—Submuriate of mercury, or calomel, one drachm and a half,
Root of jalap, in powder, three drachms,
Nitrate of potass, or common nitre, in powder, six drachms,
Syrup of buckthorn, as much as is necessary to make them into a ball, which should be given in the evening in a little warm gruel.

ERUPTIONS ON THE UDDER AND TEATS OF COWS, OR COW-POX.

This is a disease which has been long known, and which is now most beneficially applied in protecting the human race from the dreadful effects of the variolous contagion, or small-pox. It is a disorder that regularly and in a gradual manner proceeds to its mature state, and then declines and dies away so as wholly to disappear. It cannot, therefore, have any connexion with, or relation to, the grease in horses, as some have supposed, as that disease sometimes continues for years, and appears at all seasons.

In large dairies, it commonly first shews itself by the following marks and appearances: though much fever is not in general excited, the eyes of the beasts seem heavy, dull, and languid, and the production of milk is greatly diminished, often to nearly one half or more, on the attack of the disease. The cows walk about in a solitary manner, making a sort of groaning or mournful noise, and small eruptions break out on the udder and teats in an irregular manner, which at first have usually a light bluish colour or livid cast, being encircled by a creeping sort of superficial inflammation.

There is not much to be done in the removal of this disease, as it in most cases runs its regular course without danger or mischief to the animals. In some cases, however, warm stimulating drinks are recommended in order to expedite its cure more readily. And when any feverish appearances shew themselves, they may be removed by the use of mild purgatives, such as the sulphate of soda and castor oil, or any other that are cooling and gentle in their operation.

It may also sometimes tend towards more quickly removing the disorder, to rub the eruptions on the udder and teats well with an ointment composed of alum, or sulphate of zinc, or white vitriol, and that of elder, with wax and superacetate or sugar of lead; the first in the proportion of five or six drachms to four or five ounces of the second, and an ounce and half of the two last. This ointment should be used twice a day after the milk has been taken away. It may, however, be more convenient, and is certainly more cleanly in the application, to wash the parts with a mixture prepared by dissolving three or four drachms of muriate of ammonia, or sal ammoniac, in the crude state, in five or six ounces of white wine vinegar, adding to it one or two drachms of the subacetate or extract of lead, with an ounce and a half of spirit of camphor. This wash may be used as frequently as the above ointment is directed to be applied.

INFLAMMATORY SWELLINGS AND COLLECTIONS OF MATTER IN THE UDDER.

This is a complaint that often materially injures the interest of the keeper of neat cattle stock. It takes place occasionally in cows at different periods of their existence, such as are young and in high keep being, however, most apt to be affected by it, particularly about the season of calving; while such as are of a more advanced age are the most disposed to its attacks in the hot sultry periods of the summer season, especially such as are in the fattening state. But cattle of this description, which are in loose and bad states of body, are extremely subject to it at all periods, on being too much heated or too greatly exposed to cold. Any thing that excites the action of the glands and

vessels of the parts in too great a degree, whether local or general, has a tendency to produce it.

The disease is shewn by a large tumid collection being formed in some part of the glandular system destined to the secretion and preparation of the milk, the effect of which is soon discovered in the diminished quantity of the fluid, and its putting on a discoloured tainted appearance. This fluid is in some cases wholly suppressed, the swelling increasing by degrees to the state of suppuration and formation of matter. Such tumid collections are sometimes converted from these parts to the extremities, and there discharged by forming for themselves outlets or passages.

In all cases of this sort, it is for the most part highly beneficial, where practicable, to prevent their formation, as where they proceed to a highly morbid state there is often great trouble and much loss of time experienced in their management. Consequently, as soon as they are discovered to be coming on, the beasts should be secured in the house or yard, and, if in high condition, with much tendency to inflammation in the parts, they should have blood taken from them towards evening in proportion to their strength and sizes, keeping them in such situations the whole night; and in the morning, strong purges of the solutions of soda or magnesia, with castor or any common oil, may be given, and repeated until they operate fully, so as to abate the inflammatory action of the parts. At the same time the affected part or the whole of the udder may be frequently well fomented with strong decoctions of the softening kinds, such as those prepared from elder-leaves and mallows, or any such plants, applied by means of woollen cloths wrung hot out of the liquor; and the application repeated frequently for a day or two, so as to remove the inflamed state; after which, if any sluggish hardness remain, it may be rubbed with either of the following applications:

Take of—Neats' foot oil, five ounces,
Oil of turpentine, one ounce and a half,
Solution of subcarbonate of ammonia, six drachms; mix them slowly, and make a thin liniment.

Or this ointment may be better in some cases:

Take of—Camphor, half an ounce, dissolved in spirit of wine,
Soft sope, six ounces,
Strong mercurial ointment, one ounce and a half,
Superacetate, or,
Sugar of lead, rubbed with oil, two drachms; mix them into a smooth ointment, with which the swellings should be rubbed well over twice a day after milking has been well performed.

Where necessary, the milk may be drawn away oftener, and the udder be kept moist with the cold diluted solution of subacetate of lead or goulard water. The freeing the udder from milk frequently is of much utility in the removal of such swellings.

Cordial diuretic balls, with nitre, yellow resin, and juniper berries, in powder, are often very useful after the purging remedies, and should be given for several times.

By these means the disease, in most light cases, is soon removed or wholly prevented, and the fattening of the animals, where necessary, allowed to go on without loss of time or expense.

Sometimes inflammations of this kind only extend to one or two quarters of the udders, but at others to the whole. The milk taken from such parts has a flaky curdled yellowish cast; and if the disease be not timely restrained, suppuration takes place, and matter is formed in the place of such coloured milk, which comes off by the teat in so complete a manner as wholly to reduce the swellings, if it be carefully brought away for some time upon the

first attacks. If, however, this matter be suffered to stagnate and increase in quantity, large collections of it will be formed, and much injury or complete obliteration of the milk vessels will be produced in the part, so as to render it incapable of affording milk ever afterwards; great care, therefore, is always necessary to be taken in this respect in all such cases.

In all instances, however, where matter is so formed in these parts as to be distinctly felt, it is necessary to let it out by an opening in the teats or other most depending parts, that it may be freely discharged. After which, the parts should be kept well cleaned, and the matter wholly discharged, by frequently throwing warm water into the cavities, but nothing is necessary for keeping them open; and where they are slow in uniting, some mildly stimulating liquid, such as weak spirit, may be occasionally thrown in, so as to promote the more quick healing of the divided parts.

ERUPTIVE SORES AND CRACKS IN THE TEATS.

Cows, which are about to calve, or which have lately had calves, are extremely apt to be affected in this way in these parts at all times; but some are more disposed to be troubled with such complaints than others; such, for instance, as are in bad states of body. When such parts become affected in the hot season, they not unfrequently form slight excoriations and sores, which are very troublesome in milking the animals, as well from their nature and situation as from the number and variety of winged insects that infest them, the offensive ichorous discharge issuing from them being very apt, without great care, to be forced down by the hand in the operation, which is extremely disgusting. On this account, the diseased teats of the cows should always be well washed with warm milk and water before the drawing of the milk be attempted. When the business of milking has been performed, an application of the following kind may be rubbed over the diseased teats with great benefit, repeating it each time after such operation:

Take of—Dried alum, in fine powder, one ounce and a half,

Superacetate of lead, six drachms; rub them smooth with a little oil, and then add

Spermaceti ointment, two ounces and a half,

Elder ointment, four ounces; make them into an ointment.

In order to prevent the troublesomeness of insects, different disagreeably-smelling substances have been mixed and made use of with such ointments; it is not, however, yet well ascertained that insects are deterred or driven away by such disgusting smells.

STRAINS AND BRUISES.

Neat cattle are less subject than those of some other sorts of animals to strains and bruises, which probably arises from their effecting their labour with little effort by the power of the neck and shoulder, instead of the great action and exertion of the shoulder and the muscles and tendons of the legs necessary in other beasts of burthen. All the parts employed in making great exertions are liable to be strained, as well as to be bruised by different causes. Where the muscles suffer by over exertion, there is often a considerable degree of inflammatory action brought on, and the tendons are occasionally broken or torn, though this is not very usual in neat cattle. In the back, loins, and hips, strains are not, however, unfrequent in stock of this description, as they are very apt to arise in consequence of their riding on each other, as well as from slips and other causes. Bruises take place occasionally in most parts of beasts from blows,

and the action of weighty bodies upon them, which cause various degrees of pain, inflammation, and extravasation of the fluids of the parts, according to circumstances.

The means of cure, in all cases of strains and bruises, must be first to lessen and remove the pain, inflammation, and swelling of the parts, and then, in the former, to restore the lost tone and strength by suitable applications, and, in the latter, to promote the absorption of the extravasated fluids, or those thrown or forced out of the vessels into the small cells of the parts, as much as possible.

In the first intention where the inflammation and swelling of the parts are considerable, it may be necessary to take away a proper quantity of blood, either in a local or general manner, using at the same time softening fomentations or poultices; and in case there should be any tendency to a feverish state, the bowels should be kept well open by proper solutions of the sulphates of either soda or magnesia; after which, applications of the kind directed below, should be rubbed and laid on the parts, which will further reduce the swelling, and forward the taking up of the extravasated matters:

Take of—Muriate of ammonia or sal ammoniac, powdered, one ounce and a half, dissolve it in
Rain water, one pint,
Diluted solution of subacetate of lead or
Goulard water, half a pint,
Spirit of camphor, or camphorated spirit of wine, one ounce and a half; make a wash, which is to be applied by means of a folded cloth as cold as possible for several times.

As soon as the inflammatory state begins to give way, the following spirituous embrocation should be used in completing the business:

Take of—Oil of turpentine, two ounces,
Solution of subcarbonate of ammonia, or,
Spirit of ammoniac, one ounce and a half,
Compound sope liniment, or,
Opodeldoc, three ounces,
Oil of origanum or wild thyme, six drachms,
Tincture of opium, one ounce; make them into an embrocation, to be applied well over the parts twice in the day.

In deep-seated strains and bruises, this application may be rendered more powerful by the addition of stimulant blistering matters to it, as the tincture of cantharides, or their substance in fine powder, in the quantity of six drachms or an ounce of the former, and from one to two drachms of the latter. When lameness is caused by strains in the legs, a strong blister may often be used with greater benefit than the wash.

The loss of tone and weakness which often remains in the parts after bad strains, are to be removed and restored by suitable bandages, where they can be applied, and by firmly adhesive or sticking substances of the plaster kind applied to the parts. The following form may answer this intention in most cases:

Take of—Burgundy pitch, three ounces,
Lead plaster or diachylon, two ounces,
Common pitch, four ounces,
Gum kino, or red restringent gum, in fine powder, two ounces,
Tallow, as much as is sufficient: make them into a plaster, which is to be spread rather thickly and evenly upon thick fiannel cloth, while a little warm, and laid on the part; a rather tight bandage of the same kind of cloth being put over it, where the situation will admit of it.

Such plasters may mostly be allowed to stick on the parts as long as they will.

In slight superficial bruises of any kind, considerable benefit will be derived from the use of such washes as that below:

Take of—Solution of subacetate of lead, six drachms,
Vinegar, six ounces,
Tincture of opium, one ounce,
Soft water, one pint and a half; mix them for use.

The part should be kept constantly wet with the wash.

WOUNDS.

Neat cattle, as well as other animals, are sometimes exposed to various accidents of this

kind from different causes, but principally by goring each other, and by the breaking over fences.

In all such wounds as are superficial, when cleaned from the blood and other matters, as they are perceptible to the sight, nothing is necessary in the way of examination; but when they are too deep to be seen into, it is requisite to examine them either with the finger or with a blunt probe, when the inflammation has been removed. Where the wound is too small for the finger, a bougie may be better than a metal probe, on account of its flexibility, especially when it takes a winding direction. In examining a wound, it is of advantage to know the situation the animal was in when it received it, the kind of weapon, how it was directed, how far it penetrated, with what force the blow was given, and other such circumstances; and particular attention should be paid to the nature of the discharge from the wound. The knowledge of these circumstances, with that of the nature of wounds in general, will suggest the best and most proper modes of dressing and healing them.

Wounds, when of any considerable depth or extent, are for the most part succeeded by great inflammation and tension in the parts, on the speedy prevention or removal of which their cure very materially depends. In this intention, the first thing necessary will be proper bleeding, and then suitable saline purges; nothing stimulating should be used in any way, but softening discutient fomentations should be applied until the inflammatory tension has been either prevented or wholly reduced.

The examination of such wounds should never be performed until the tension and inflammation in them have been completely subdued, when it may be correctly ascertained how far matter is contained in them, as it may often be proper to enlarge the first wound to render the discharge more full and complete, or to form another opening in a more depending part for its more ready discharge. At this time stimulant substances, such as are described below, sometimes become necessary, and should be applied in the form of solutions or otherwise.

The danger from a wound will be in proportion to the size of the vessels that are divided, and the importance of the injured part with respect to life. The nearer a wound is to a vital part, the more dangerous it will be. The different progressive states of a wound may be considered under those of adhesion, digestion, or the discharge of matter; incarnation or filling up with new flesh; and cicatrization, skinning over, or healing.

In the treatment of wounds, the following particulars should be attended to. When the extraneous bodies are extracted or cleared away, the hemorrhage suppressed, where it can be properly done, all morbid tension and inflammation in the wounded part removed, and the lips of the wound, where this is requisite, brought properly together with a flat crooked needle and thin white leather cord well tallowed, or silk or thread of several thicknesses; then dressings should be applied, which may be pledgets of soft lint covered with one of tow, spread with some proper ointment large enough to cover the whole; and these may be secured by means of such bandages as the situation of the wound best admits of. The first dressings should usually remain three or four days, or until the discharge of matter renders the separation of them easy; and when they are removed, similar dressings may be applied every day or two, according as the discharge is more or less abundant or acrid. If after the first dressing any digestive is found requisite, add to resin cerate, a little oil of turpentine, and

use it properly warm, care being taken, each time, that the surface of the wound is cleansed, that it be done by dabbing it gently with soft lint, and not wiping it, lest the tender granulations should be destroyed. The surface of the wound should not be made quite dry, but be left somewhat moist, as the digestion is less uninterrupted in this case, and the healing more readily forwarded.

It is commonly observed, that the principal interruption to the healing of a wound, made with a sharp instrument, is the fungus. This, however, may be suppressed by dry tow or lint, and a proper compress upon it; or if it advance above the surface of the skin, the edges need only be touched with some escharotic, as sulphate of copper or blue vitriol. But it sometimes happens, that an obstruction to healing arises from the flabbiness of a wound, which is generally removed by dabbing it at each dressing, with lime water and tincture of myrrh, or with a slight solution of oxymuriate of mercury or corrosive sublimate. Thus, if an ill constitution or bad habit of the animal be no impediment, wounds on the exterior parts are soon healed.

Useful forms, in the above intentions, are as below.

In the former, this seems to be proper in many cases, as well as those already noticed:

Take of—Common turpentine, three ounces,
Yellow wax, half an ounce,
Pure tallow, three ounces and a half; melt them gently together, and when set to cool, add,
Nitric oxide of mercury, rubbed fine, with a little oil, one or two drachms or more, as may be necessary, stirring the whole until cold.

In the latter, this may often be found beneficial.

Take of—Oxymuriate of mercury, ten grains, dissolve it in
Compound tincture of benzoin, one ounce and a half,
Rectified spirit, half an ounce; mix them for use.

After the wound is filled up with flesh, dusting the surface with prepared calamine will usually effect the last intention of cure, or that of the cicatrizing of the wound, and thus finish the healing process.

In regard to the uniting of the lips of wounds, by means of the needle, it is not always proper, but must depend much upon circumstances. In cases where the outward openings are small, but the wounds of much depth, and where there is much difficulty in bringing the parts of them together in consequence of their receding greatly, there might be injury done by confining the matter, as well as by giving too much irritation; in each of which, too, much increase of inflammation would take place: however, in most surface wounds, where the separation of the lips are not too great, they may be properly secured in this manner, but without any stimulating liquid being put into them; only cleaning them when necessary, by simply washing them with warm water or milk and water.

In case a small artery be wounded, if it be quite divided, it retracts, and the hemorrhage is soon spontaneously restrained; if it be punctured or partially divided, and it can be conveniently come at, let it be wholly divided, or the wound enlarged, and then the artery may be tied, if proper pressure prove ineffectual. When a large artery is punctured or divided, it must be taken up and secured with a needle and ligature, as before directed. Bleeding from wounds is seldom of such consequence in these animals as it is commonly supposed to be, generally stopping of its own accord. It therefore requires no assistance from art, except where very large vessels are wounded, when the best means is that of pro-

per full pressure on the bleeding part by suitable bolsters, kept firmly on the part by a roller of the proper kind.

All kinds of wounds should be kept from the air as much as possible.

Wounds sometimes penetrate the cavity of the breast and belly, and sometimes injure one or more of the viscera; the first is known by the probe, the latter by the discharge which issues from them. If the symptoms attending a wound that penetrates into the cavity of the breast or belly be favourable, and there be no discharge from any of the viscera, it may be concluded that they are unhurt; in which case, after excluding the air which may rush into these cavities, they may be treated as simple wounds. If any of the viscera have protruded, being unhurt, they should be returned with all speed; but if wounded, use the glovers' suture to them, leaving three or four inches of the ligature out of the wound. If the protruded viscera have been exposed to the air, it may sometimes be necessary before the return of them, to use a slight fomentation of warm milk and water or some thin starch. In all these cases, flannel is the best bandage, because it gives way as the breathing requires.

In cases where, from wounds in the belly, there is a protrusion of some part of the bowels, it should, as quickly as possible, be put back in the most gentle manner, any filth that may be upon it being first well washed from it by simple warm water as above; then, when returned into its place, it must be kept there by properly stitching up the wound, and the use of a suitable bandage. The beast should be kept quiet, have little food, and that of the more opening kind, so as to keep the body in a rather loose state. These are the most material points to be attended to in all such cases. But where, from the quantity of air or distention, the protruded part becomes so great as not to admit of a return, the wound should be sufficiently enlarged for the purpose, by using the knife in a cautious guarded manner.

Wounds in the principal internal blood-vessels are mostly deemed mortal, but great care should be taken to stop the bleeding by pressure where possible. Where a nerve is wounded, a variety of alarming symptoms come on in proportion to the tenseness of the part it is attached to, and the peculiar irritability of the constitution. When the pain is extreme, it is sometimes only to be relieved by dividing the nerve. This accident is soon discovered by the sharp ichor which distils from the part, and its excoriating the circumjacent parts. When a tendon is wounded, the same symptoms do not follow as when a nerve is injured. Swelling occurs, though not suddenly, advancing gradually with the inflammation. The most common applications to wounded nerves and tendons, have been mostly of the spirituous sort, such as the oil of turpentine and such like, but they are productive of the worst symptoms. Instead of these, apply warm poultices, having first covered the wound with lint; or, instead of the poultice, cloths may be applied after dipping them in warm brandy and vinegar mixed in equal parts. Fomentations may be used before the application of the poultice, if inflammation attend; or, when the case admits of it, the part may be soaked in warm water.

Horned cattle are not so subject to wounds of the joints as they are to common or simple wounds, which generally heal in a short time. The two great consequences to be avoided in wounds of the joints are, inflammation and pain: the former is to be attempted by bleeding, and by pursuing a careful, abstemious, debilitating plan of diet, and the latter by opiates.

Different very stimulating and corroding

solutions, tinctures, and liquid matters, have often been recommended in these cases; but they are evidently highly improper in the early stages of most such cases, as tending to cause or increase the inflammation that generally succeeds such accidents. It is simply necessary to exclude the air as much as possible, and prevent or remove the tension and inflamed state of the parts by suitable discutient fomentations and washes of the saturnine or other such kinds; and when the active state of the parts is over, the application of suitable portions of lint moistened with the tincture of myrrh, properly securing them in their situations. It is only when they are long or tedious in healing that any sort of strong, stimulating, or active caustic solution or substance becomes necessary in such wounds.

ULCERS.

There are various kinds of ulcers, but those of the cancerous kind are the most difficult to heal of any to which horned cattle are liable: they generally make their first appearance in a hard livid tumour on some of the glandular parts, and require great attention. When the parts will admit of extirpation, they may be removed by a proper knife, or by caustic.

After the wound thus formed has been thoroughly cleaned, it may be sprinkled with the nitric oxyd of mercury, or touched with the nitrate of silver, or lunar caustic, and afterwards be dressed once a day with small pledgets of lint or tow dipped in such a solution as that below:

Take of—Oxymuriate of mercury, half a drachm, dissolve it in
Rectified spirit, one ounce and a half,
Oil of turpentine, one ounce,
Tincture of myrrh, one ounce and a half,
Liniment of verdigris, two ounces; mix them well together for the above use.

Some of these ulcerating tumours are movable and others fixed; some are inflamed, and quickly break out, discharging a thin acrid ichor, or at other times a thick yellow matter, while the wounds are apt to fill up with fungous flesh. Proper saline laxatives, or purgatives, should be given once a week or oftener, as there may be a necessity, for some time.

When the scirrhous swellings of these glands first appear, they sometimes may be prevented from ulcerating, by the use of a sufficient quantity of the following ointment constantly well rubbed on the parts once a day for some length of time:

Take of—Strong mercurial ointment, four ounces,
Common turpentine, two ounces,
Oil of turpentine, one ounce and a half,
Compound sope liniment, two ounces and a half; mix them for use.

In these ways most ulcers and tumours of these kinds may be perfectly and readily removed.

CUTTING, OR CASTRATING AND SPAYING THE YOUNG OF NEAT CATTLE.

These operations are always best performed at the more early age of the animals, as from about a week or two, to five, six, or more; being then executed, not only with the most ease and success, but with the greatest advantages in many different points of view.

In the execution of the business on the males, different modes and practices are pursued by different operators, or persons who are employed in the performing of it. By some, in the very young state of the calf, the bag or cod containing the spermatic cords and vessels, and into which the *testes*, or parts necessary to the future production of animals are to descend, have the tip or lower end of it cut open, or the whole slit up in length, with a sharp knife, and the cords drawn completely out; after which the divided parts are again brought into contact, and secured in that position by a stitch or

two with a proper thread. Some operators then use ointment or salve of the elder or green kind to the divided sides of the wounds, or cut portions of the bag or cod. But it is probably much better, and more productive of the healing process, to put nothing of the sort to such fresh wounds, the edges of which are in connexion in order to be united, as they must do injury instead of good. By others, when the cod has been thus laid open, these cords are cut off close to the belly of the calf, in the same way, and some sort of application then laid or rubbed over the part, generally those of the green ointment or terebinthinate kinds, the opened part being either secured in the above manner, or left to form a discharge and heal. Other operators, again, after the cod has been cut open, as above, use a hot iron for finishing the operation, after which dressings are applied as above, and of the same kinds.

These are the most usual methods practised with young calves of the male kind; but with older neat cattle stock, as young bulls of one or two years old, which are to be *segged*, the cod is mostly divided the whole length, or a part of it taken off; and the hot iron, with such applications as those already mentioned, are employed.

In the spaying of heifer calves, or young heifers of some age, which is a rather nice operation, and in which there is, of course, a greater care and attention required than in cutting male calves; it is probably best and most successfully performed at the early age of the young females, though it is not unusual to have it done at a more advanced stage of their growth, as this is a very beneficial operation to have executed, with the view of fattening as well as of working.

The operation of spaying is performed by cutting the animals in the mid flank, on the left side, with a sharp knife or lancet, so as that the parts destined for conception may be extirpated or cut away. The wound is then secured by suture, or in some other more suitable way, but all applications of the salve kind are not only unnecessary, but often injurious, by retarding the healing process. The most usual way is, to make the incision in a sloping manner, about two inches and a half in length, so as that the fore finger may be introduced in a direction towards the back, to feel for the ovaries, which are two glandular bodies, as big as small pullets' eggs, lying one on each side of the uterus, one of them being drawn to the wounded part, has the cord or string cut, and thus both are rendered capable of being drawn out. The animals should be kept rather low, and not too warm, for a few days afterwards, so as to prevent too great a degree of inflammation from taking place.

This is the manner of executing the business in the calf state, but in old beasts, as those of one or two years old, it is mostly done very differently, as only the ends of the generative parts are then cut away, about the size of the end of the thumb to the first joint, which is a less painful and hazardous operation.

Section XX.—*Uses and Applications of the several refuse Substances and Parts of Neat Cattle.*

Every such part of these animals, whether male or female, are useful, either in manufactures, arts, commerce, or the improvement of the soil; as the blood, fat, marrow, hide, sinews, hair, horns, hoofs, milk, urine, liver, gall, spleen, bones, and dung.

THE BLOOD.

This is a material which is sometimes used as manure for fruit-trees, and which, with iron,

forms the basis of that fine colour the Prussian blue. It is an excellent substance as manure, for almost every kind of soil, when properly mixed with other matters: the store-master and farmer should, therefore, be careful to use and procure, as often as possible, all the offals of animal matters in shambles and other places, by which means they may increase the value of the grounds they cultivate in the most full and best manner.

There ought, therefore, to be in all large towns proper places formed and provided for the reception of all such matters, as well as of other animal kinds; in which places other suitable substances of the earthy and other sorts should be in readiness for mixing and blending with the above matters. By these means great supplies of valuable manure might be provided and secured, much nuisance prevented, and great disgust and inconvenience be avoided, so as to render towns in general much more clean, healthy, and comfortable than they now are; while at the same time the expense would be doubly repaid by the sale of the manure thus raised. These are points which deserve and demand particular attention and consideration, as it is highly disgraceful to see various kinds of dead animals and many other putrid substances, which are capable of being turned to much advantage in this way, lying in or thrown about the streets and other parts of populous towns.

The blood, and other animal matters, which are so beneficial as parts of manure, should not, therefore, be lost; nor should the former, which is useful for so many other proper purposes, be given for the fattening of swine, as it is sometimes in the metropolis, and perhaps other large towns; it being a very unfit material as food for them, producing a very inferior sort of pork, as to firmness, flavour, the texture of the flesh, and the quality of the meat in every respect.

FAT AND MARROW.

The fat is the oily unctuous part of a substance, which is separated from the blood, deposited in the cells of the membrana adiposa, from the innumerable little vessels that are spread amongst them; and is to be found immediately under the skin in almost all the parts of the body. In some animals the vesicles of the membrana adiposa are so full, that the fat is many inches thick; and in others they are almost flat, containing little or no fat. There are two sorts of fat, one white, or rather yellow, soft, and loose, which is easily melted, called *pinguedo*, or loose fat; another, white, firm, and brittle, which is not so easily melted, called *sevum*, suet, or tallow. Some reckon the marrow of the bones a third sort of fat. It is the oily or fatty material contained in the middle of bones in their reticulated parts, that affords oil in the manufacturing of them, and makes them useful as manure.

The fat is used for candles, as well as many other sorts of light, and also to precipitate the salt that is drawn from briny springs. It is a substitute for oil on many occasions, and has several other uses and applications.

THE HIDE.

This has been of great use in all ages; when tanned and curried it serves for boots, shoes, and many other conveniencies. Vellum is made of the thinnest calf skins, and the skins of abortions. When the teguments, cartilages, and gristles, are employed, it is for the indifferent; and for the finer, the cuttings, parings, and scraps of hides, are boiled in water till the gelatinous parts of them are thoroughly dissolved, when the mass, properly dried, becomes glue. The very small refuse parts are useful as manure, where they are in quantity.

The leather formed by hides is of many dif-

ferent kinds and qualities, adapted to a variety of different uses and applications in the arts and manufactures of the country, from which very great advantage is derived; as, besides the purposes already noticed, it is of particular utility in the making of all sorts of harness—in the construction of coaches and carriages of various kinds—in pump work—in many kinds of machinery, and in a vast diversity of other applications.

The hides of cattle are, consequently, of very great utility and benefit, as they relate to a great many uses and intentions which are of material advantage to the public, as well as the farmer.

THE SINEWS.

These, after due preparation, are rendered a kind of thread or small cord, used in sewing saddles, making racquets, and many things of a similar nature. They are particularly tough, and may be used in many other ways with great utility and benefit.

THE HAIR.

This is also valuable, and is appropriated to several purposes. The long hair which comes from the tail is frequently mixed with horse-hair, and is sometimes wove, and sometimes spun into ropes. The short hair serves to stuff saddles, mattresses, chairs, and seats of various kinds. The refuse hair of hides, and from other sources, when procured in sufficient quantity, is found very useful for plaster, and as a manure, in some instances.

THE HORNS.

Of these, combs, boxes, handles for knives, cups, &c., are manufactured. When softened by water, they are rendered pellucid laminæ for the sides of lanterns; an invention ascribed to King Alfred, who first used them to preserve his tapers from the wind. Horn shavings, or the small pieces of waste horny matters, produced in different manufactures, are very useful as a manure. There are two sorts of these matters employed for this purpose in some places; the *small*, or turners' shavings, and the *large*, or refuse pieces of horn. The first of these sorts are purchased, in some places, at about thirteen or fourteen shillings the quarter, or two-bushel sack, stuffed full, mostly weighing about two hundred and a half; but the large shavings cost about two shillings less the quarter. Horn shavings are used in the same way and quantities as furriers' clippings, except that they want no pricking in, and the larger are generally ploughed into the land three months before sowing wheat or barley. Horn shavings answer in most soils and seasons, except very dry ones, when they will not work. The small shavings are much the most useful and effectual as a manure; they allow between two and three quarter sacks to an acre. Horn saw-dust with mould is an excellent compost for flowers. Horns are used in the same manner as bones, as will be hereafter shown. Horn, when reduced, is also of use in hardening, and giving what is called a proper temper, to metals. The matter lying within, on which the horn is formed, is called the *slough;* and, when dry, is used in making walls or fences, in which way, when covered from wet, it will last a long time. It is likewise admirable in mending roads where the soil is soft and spewy; for, when dissolved, it becomes a glutinous substance, that binds amazingly with gravel.

The manufacture of horn constitutes a very extensive source of trade in many places, as the articles which are formed with it are extremely numerous, being in some cases from thirty to forty or more. The large horns of neat cattle, in the bottom parts, are cut and made into drinking-horns, which are of considerable value,

and those which have a beautiful clouded, mottled, or spotted appearance, are chiefly used in the forming of the hafts of pen-knives, and other instruments, and are of still more value. The horns of such cattle are commonly sold by the hundred weight, of six score, and usually fetch about three pounds; each pair being worth about one pound, when they are good of their kind. The manufacture of horn is consequently of much use and importance to the country, by the employment which it affords, as well as by the profit which is drawn from it.

THE HOOFS.

These, when ground, or broken down by mills or other contrivances, have been found extremely powerful and lasting in their effects as manure. The hoofs of all sorts of animals are useful in this respect, as will be seen in speaking of bones. They are useful, too, in the same way as the blood, for forming Prussian blue.

MILK.

The uses of the dairy, from whence come butter and cheese, have been already explained. Milk is also found a good and palatable nutriment as food, in many cases, and especially for those whose organs of digestion are weak and impaired.

The quality or goodness of milk is very greatly influenced by the nature of the food which is used in the keeping of the cows, those matters which approach most to the natural grass kind affording by far the best and sweetest milk. Where any kind of keep is employed in this way that has a quick tendency to take on and run into the state of fermentation, and put on a bad and disagreeable flavour, the milk is more or less affected by it, however perfectly it may have been decomposed, formed, and taken up, by the glands and organs of the stomach, destined for the purpose; as neither these, nor the secreting organs of the udders of the cows fully correct the injurious tastes that are communicated by such food. But notwithstanding this fact, as some breeds of cattle are found to produce better and more sweet milk than others when kept on the same kind of food, it would appear also that there is something in the nature of the breed of the animals which are made use of for the purpose of milking. It is therefore probable, as it is the smaller kind of cows that most commonly give the best and most rich and sweet kinds of milk, that the glandular parts that form and take it up, as well as those of the udders of these cows, may be more finely formed than in those of the very large sorts, which usually afford a more watery kind of milk, and in larger quantities. Too few trials have, however, yet been made fully to decide this very curious and interesting point in the nature of such cattle.

URINE, LIVER, GALL, AND SPLEEN.

The latter of these had formerly very absurdly a place in the Materia Medica, but more efficacious and agreeable medicines are now substituted in their place.

The liver and spleen are useful as food in some way or other; and the gall, which is produced in large quantities in the gall-bladders of these kinds of cattle, is made use of in the scouring and cleaning of cloths and other articles by the scourers and dyers, as well as for some other purposes.

Urine is of great use in forming manure composts, being an extraordinary fertilizer of most kinds of soil in that state. Columella has asserted that old urine is excellent for the root of trees; and Hartlib has commended the Dutch for preserving the urine of cows as care-

fully as they do the dung, to enrich their lands. It is a fluid, in such mixture, capable of being employed with great benefit, both on meadows and on arable land, and which renders them uncommonly fertile. In the former case, the best time for using it is during the winter, when the rains will wash the fertilizing saline particles into the soil; or the land may be done with it early in the spring, when it is laid up for hay; because no cattle will touch the grass so long as the salt adheres to the blades of it in any way. Another circumstance necessary to be attended to, in order to make the most of this valuable manure, is, that it be mixed up and carried to the meadow or pasture intended to be done with it in dry weather, as the farm-yard liquor in the reservoirs is at that time the most strongly impregnated with salt and carbon, which may be known by its deep brown tinge. Thus the reservoirs or ponds appropriated for its reception may be constantly kept in a state of readiness for that purpose, while the land may be done with it in such a manner as occasion may render necessary.

It has been remarked, that the powerful effects of urine in promoting vegetation are generally well known; but it is not recollected that any experiments have been made on its salts, tending to ascertain and show their distinct effects, as there are two sorts of saline matters in urine; the *soda phosphorata*, or phosphorated mineral alkali, and the *ammonia phosphorata*, or phosphorated volatile alkali.

It is believed that the *ammonia phosphorata* is the cause of the luxuriant vegetation of corn at those places where the urine or dung of animals happens to fall; as an experiment made with these salts on a bed of Swedish turnips in the garden shewed that *ammonia phosphorata*, in the quantity of sixty grains to a yard square, had an excellent effect. The *soda phosphorata* had also a powerful effect, but of an opposite nature. For a time it seemed to be useful, but suddenly the plants manured with it were seized by a small yellow worm with many legs, which abounded then. The plants were entirely destroyed on that particular spot where the *soda phosphorata* was used, but the spot manured with the *ammonia phosphorata* apparently escaped.

Urine should never be made use of, except when well combined, with and united, to some proper earthy or other such material; by which it is not only rendered capable of going a great deal further, but becomes a much better manure; as its too caustic saline nature is very often injurious when applied in the liquid state. Besides the uses of urine in these different ways, it is of great utility in the processes of scouring, and many others of a similar kind.

BONES.

Chemical analysis has shewn that the constituent parts of bones are oil, alkaline salts, and animal earth united with carbonic acid gas or fixed air. The oil is in much greater proportion than the alkali, which renders bones rather a heavy manure. This oil is much used by coach-makers and others, in dressing and cleaning harness and all trappings belonging to coaches. The bones are used by mechanics where ivory is too expensive, and when calcined, they afford a fit matter for tests or cupels for the use of the refiner, in the smelting trade.

Bones are used as a manure, both by themselves and with other substances. The common way of treating them is to break them with a mill into pieces about the size of a marble or nutmeg: they are afterwards laid upon the field in small heaps, at regular distances, and covered with earth: after remaining in this state for some time they are spread on fallows,

on grass, or on turnip land. Much trouble is seldom taken in adapting them to the soil for which they seem best calculated, being laid indiscriminately upon lands of every description, and for the most part unmixed with any other substance. But, bones being much kept together by carbonic acid gas or fixed air, unless they are either laid upon soils possessing principles that are capable of depriving them of this air, or have something of that kind previously mixed with them, the texture of their parts will remain unbroken, and they will be of little utility.

It is a trade in Sheffield, to grind bones for the farmer, who will give sixteen pence a bushel, and send sixteen miles for them. Some substance must then be mixed with them that is capable of dislodging the carbonic acid gas or fixed air, and disuniting the principles contained in the bone: for this purpose nothing will be found so useful as quicklime. Where there is no opportunity of grinding them, they may be mixed with lime in a heap, and will in this way soon be reduced to powder. It is also a judicious practice to mix ashes with them, a cart-load to thirty or forty bushels of bones, turning the whole when it has heated twenty-four hours: it may be laid on ten days after it has undergone this preparation.

Bones are sometimes burnt for the ashes; but this is a most wasteful practice, as in this operation they are freed from the oil and mucilage, and are merely phosphoric acid united to lime or phosphate of lime: in this state, they are a stimulating manure, while in their unburnt state, they are both nutritive and stimulating. Of all manures, bone is perhaps the most permanent. What has been said of bone in its recent and burnt state applies likewise to horns, hoofs, and many other similar substances, as like bone they consist of phosphate of lime, animal oil, and mucilage.

When bones are used in their simple state, without the addition of earth or lime, they ought never to be laid upon any but the sharpest and most active soils, such as limestone, chalk, or gravel: upon all these they will meet with more or less calcareous earth, which will in some degree disengage their carbonic acid gas or fixed air, and dissolve the oil contained in them: but upon deep clays, tills, or loams, they should never be applied in that state. But when made into a compost, they may be used with advantage upon soils of every description, by laying it upon or near the surface when the crop is in a growing state. All kinds of bones will answer the purpose of a rich dressing, but those of fat cattle are unquestionably the best. The London bones are frequently boiled, and must therefore be much inferior to such as retain their oily and mucilaginous parts.

DUNG.

This in general is the most common, and upon the whole the most efficacious, of all manures. It is supposed to promote vegetation in various ways, by increasing the quantity of vegetable food in soils, by enlarging the pasture of plants, by communicating to them a power of attracting the vegetable food from the air, and by contributing to the preparation of the food for the nourishment of plants.

The dung of cattle is the most common manure in use, but distinctions are frequently made that ought to be particularly regarded and attended to; as that which is formed from the dung alone in the state which it passed through the bowels of the beast is very materially different from that which is produced in the farm-yard from the decomposing strawy litter dung, and urine, which, as being a compound substance, is mostly of a far better and richer quality.

The quality of the dung in its simple state would seem to be much affected in these as well as other ruminant animals, from the complicated nature of their stomachs and the length of their bowels, as being thereby, in consequence of the much greater delay, far more attenuated, reduced, and exhausted of its rich and valuable parts than in those kinds which do not ruminate, as the horse; and of course, very inferior as manure for most purposes, contributing very little in any other way than as increasing the quantity of the mouldy material in the soil.

It has been supposed by some persons, that that which is made in the early part of the winter season is much better and more rich than that which is produced towards the beginning of the spring, as being injured by the effects of the increasing heat; but the time of the year can have very little influence on its quality, as the dissipation of its more useful parts can be but very trifling. It is most probably, therefore, its retaining less of the animalized enriching materials in its composition, in consequence of the circumstances which have been stated, that occasions the very great inferiority of it as a manure, when compared with the dung of those animals, which have differently-formed stomachs.

The same is the case with the dung of all the other kinds of animals which ruminate, besides those of neat cattle, as will be afterwards seen in considering the nature and uses of their several refuse parts.

Chapter II.—LIVE STOCK.

SHEEP.

Section I.—*Their Nature, Use, and Circumstances of them.*

These are animals which are of very considerable value and importance, not only as contributing largely to the wants and necessities of mankind in many different ways, but as supplying the rough materials which are in such demand for the working and carrying on of so great a number of the most useful manufactures and arts of the country.

Sheep seem in the more early states of society to have been raised and domesticated, in a great measure, for the use of the skin and fleece, however much they may since have been made to serve different other purposes of equal utility or benefit to the public.

This well known kind of live stock belongs to the class of ruminant animals, or such as chew the cud, and of which there are numerous sorts and varieties. In its generic character it is distinguished by being with or without horns: when with horns, they are hollow wrinkled, turning backward or intorted in a spiral manner. There are eight front teeth in the lower jaw, but in the upper none. The naturalist, Buffon, has given these animals the character of stupidity, want of sagacity, and some other qualities, which seems by no means well founded. The sheep is naturally a timid animal, but exceedingly harmless, and a lamb has been always reckoned an emblem of innocence.

APPELLATIONS OR USUAL NAMES.

In the male sheep, the young of the tup kind, while sucking and following the ewe, has the title of *ram* or *tup* lamb; when, after being weaned or taken from the mother, it is called a *tup hog*, *hoggit*, *lamb hog*, or *teg*, throughout the first year, or until it renew two teeth and is shorn; then a *shearing* or *shearing ram*, when he is a year and a half old; after which time, when again clipped or shorn, a *two shear*, *three shear*, and so on, according to the shearing. The *ram* or *tup* lamb when castrated, has the term *wether lamb* applied to it while it is sucking; then until shorn, *wether hog*, when it gets the name of *shearing*, and afterwards other terms as explained below. In some places, male lambs are called *heeders* in contradistinction to those of females, which are termed *sheeders*. A ram is also known by the ancient term, *tup*.

In the female sheep, the young ewe while sucking is named an *ewe lamb*, or a *gimmer lamb*, and after being weaned, a *sheeder ewe*, *gimmer hog*, or *ewe teg*. In the second year the wether takes the name of a two *shear wether* or *hog*, and has the first two renewed or broad teeth, and is called a *two-toothed teg;* the ewe is called a *theave* or *two-toothed ewe* or *teg*, and when twice shorn, *double theave*. In the third year, a *three shear wether hog* or *four-toothed wether;* a *four-toothed ewe* or *theave*. The fourth year, a *six-toothed wether* or *ewe;* when in this, or the succeeding year, having got eight broad teeth, they are said to be *full mouthed sheep*. An old ewe is styled a *crone* or *drupe* in different places.

In the west country, ram lambs are called *pur lambs*, and ewe lambs *chilvers*. In the north, from lambing time until martinmas, when they are salved, they are called *tup lambs;* and from that time to the following July, when they are shorn, they are named *tup hogs;* and ever after *tups;* they are also styled *castrated wedder lambs*, *dinmonts*, and *wedders*. Females, in the same order, *ewe lambs*, *ewe hogs*, *gimmers*, *young ewes*, *old ewes;* and those ewes which are not with lamb nor giving milk, are termed *eild* or *yield* ewes in some northern districts.

In some cases, the Wiltshire sheep are called *horn*, or *horned*, *crocks*.

TEETHING.

This commences, and is completed early with the lamb, it being known that one of three months old has had its complement; namely, eight small or lamb's teeth, which are in the lower jaw, as in the upper there are none. Two of these in front fall, and are replaced by two broad or sheep's teeth, at some period previous to the sixteenth month, sometimes, although rarely, within a year. A similar renewal of two such teeth takes place every succeeding year until towards the end of the third, or more properly three shear; but sometimes during the fourth, or in the commencement of the fifth year, when the sheep becomes full mouthed or aged, having acquired its eight broad teeth. It is said, that sometimes sheep renew only six of their teeth, three on each side, though they have eight in the lower jaw, as it is believed to be erroneous that they lose the two in the front or middle; as when hog sheep by accident in eating hard food or otherwise, lose these teeth, they never get them again in a perfect manner.

AGE.

It has been seen above, that the age of sheep is not calculated from the time of their being lambs, but from that of their being shorn; for, notwithstanding they are commonly near sixteen months old when first clipped, it is not considered a *shearing* until that actually takes place, when they are said to be one year old.

The life or age of sheep may be prolonged beyond twenty years. A bell-wether in Kent, is said to have lived full twenty-four years, the wool decreasing in quantity and quality with the increase of years, until the body became bare in patches. In common, the incipient decay of the teeth, or the broken mouth in sheep, has been considered as an infallible sign that their usefulness is on the decrease, and that there is a necessity for their being replaced by others of a younger kind. Old ewes, however, will breed good stock, and have in some cases been kept until eight or ten years of age; but old rams are not to be depended upon. The age of rams is reckoned by the number of times they have been shorn, the first shearing taking place in the second year, namely, a shearling of one year, two shear, and so on, as has been before explained.

GROWTH.

The growth of sheep continues to advance till at least three years old, when it is in general considered as in the most proper state for the purpose of the grazier, though it is employed in this way till a much later period, sometimes even till five or six, particularly with the view of breeding; but an early maturity is a property of much consequence, especially for the grazier. The breeds, sorts, or varieties of this animal that are scattered and dispersed over the globe are almost endless.

ORIGIN OF DOMESTIC SHEEP.

Any attempt to trace the origin of the breeds or sorts of domestic sheep must be attended with considerable difficulty, on many accounts, and, from several different causes must always end in uncertainty. Some naturalists of great celebrity have, however, strongly asserted, but without adducing any sufficiently satisfactory proofs, that the wild sheep, Siberian argalia, or Russian sheep of the rock, is the parent stock of all the varieties of domestic sheep. It is about the height of a small hart, but much more robust in its make. Its form is less elegant than that of the deer, and its legs and neck shorter. Its head resembles that of the common ram, with long straggling hairs about the mouth, but it has no beard. Its ears are rather smaller than those of the ram, and the horns in the full-grown animal are large, weighing about sixteen pounds. Its tail is very short. In summer the coat consists of short sleek hair, resembling that of a deer; but in winter it is of a wool-like down, mixed with hair, every where an inch and a half long, and concealing at its roots a fine woolly down, mostly of a white colour. The colour of its coat is in common of a dark gray, inclining to brown, the longer hairs having white tips. In some cold regions they have more recently been found of a white colour.

It is probable, that the weight and dimensions in the full-grown male and female, and the lamb, may not be greatly different from those of the larger breeds of our domestic sheep.

The wild sheep is found in all its native vigour, boldness, and activity, inhabiting the vast chain of mountains which run through the centre of Asia to the Eastern Sea, and the branches which it sends off to Great Tartary, China, and the Indies. It delights in the bare rocks of these mountains, where it is constantly found indulging itself in the sun, avoiding the woods, and all other objects that intercept its rays. Its food consists of alpine plants and rocky shrubs. It, however, prefers a temperate climate, though it is found in the cold eastern extremity of Siberia and Kamschatka; which sufficiently shews that nature

has given a range to sheep in the wild state, equal to that of man; a circumstance which should make us slow in believing that the sheep is a local animal, or one, at least, that must be confined to certain latitudes, to possess all its value and perfection.

The wild sheep loves solitude, and, of course, flies from the haunts of man; consequently, as a country becomes peopled, it abandons it, unless prevented by insurmountable difficulties, such as the surrounding sea: it is, however, sometimes met with in an inhabited island. The young of the female is brought forth before the melting of the snows; and the lamb much resembles the young kid, except that it has a large, flat, crusty, raised part, in place of horns, and that it is covered with a woolly frizzled hair, of a dark gray colour. There is no animal more shy than this, and on such ground as it is accustomed to, it is almost impossible to overtake it in pursuit; as in its doubling and winding course, it scrambles up and gets over the rocks with wonderful agility and ease.

In proportion as it is wild and intractable in the adult state, it is mild and easily tamed in that of the lamb, as numerous trials have fully shown. And in being fed, as in the domestic sheep, it should first have milk, and after that fodder or food of the proper kind.

It is no longer found, as formerly, in the regions of Upper Irtish, and some other parts of Siberia, as they have become inhabited; but it is common in the Mongarian, Sangarian, and Tartarian mountains, where it enjoys its favourite solitude. It is also met with on the banks of the Lena, as high as sixty degrees of north latitude, and propagates its kind in the cold eastern regions. It is likewise found in the mountains of Persia; and in the Kurile islands, where it is said to attain a large size. Like all the varieties of the domestic sheep, when left at full liberty to follow their own instincts and habits, it feeds on acrid plants in the early spring, until those of a milder kind spring up; and frequents the salt-marshes, which every where abound in Siberia, licking the efflorescent salt, that rises even on the ground, by which it is said to be restored, in flesh as well as vigour, from the debilitating effects of the winter keep, and rapidly to increase in flesh and fatness.

This is the description which has been given of this animal of the sheep kind, which would seem, from its nature and habits, to be the most likely of any to have given rise to the several sorts of domestic sheep in this and other countries.

FOREIGN BREEDS OR KINDS.

There are in many other parts a number of singular and curious sorts of sheep, that have different properties and circumstances attending them; and which not being generally known or understood, may here be properly noticed, and briefly described.

In the very cold regions of Iceland, and Russia, and others of the north, there is *a many-horned breed* or sort of sheep, which have a considerable similarity to those of the domestic kind of this country in the shape and make of the body; but which vary much in the number and nature of their horns, which are, however, for the most part, from three or four to seven or eight; and which are flattish, and proceed from the upper fore-part of the head. They have long, smooth, and hairy wool, that weighs from four to five pounds in each sheep. It is above of a dark brown colour, and below that external hairy covering, which is shed at certain seasons, there is an abundance of fine, short, soft, internal furry down that is of great utility and value for many purposes.

In Russian Tartary there are a sort of round-

faced sheep, which are large, *polled*, and *lop-eared*, that have some degree of resemblance in their form to different kinds of this country, as those of the Dorset and Wiltshire horned breeds. They are somewhat larger than our sheep in general. They have wool which is long and thick, and which in the male is of a roan colour or a lightish brown blended with white, while in the female it is a mixture of black and white: there is, in the place of a tail, a large cushion or protuberance of fat that covers and occupies the rump part, from which they have been called by some naturalists *fat-rumped* sheep. This fatty projection is said to have an exquisitely delicate marrowy flavour in eating.

Some consider the wool in these sheep as rather short of the kind, but not coarse; yet having hair growing through it. The sheep are so prolific as generally to bring forth two or three young at a time, and are in this way very beneficial.

There is in Wallachia, Crete, and many of the Archipelagian islands, a *screw-horned* breed or sort of sheep, which have singularly curious horns, that are twisted in a spiral manner, and which stand in an upright direction, in the screw-like form, from the top of the fore part of the head to some considerable length. They are in size and form much the same as the sheep of this country, but they bear a long shaggy coat, which is not of the coarse kind. They are an extraordinary ornamental sort of sheep.

In most of the tropical climates, there is the *African* or *Guinea* breed of sheep, which are large, strong, and of swift movement, with short horns, pendulous ears, and coarse hairy coats, having a sort of loose skinny dew-lap hanging under the chin; and which, though domesticated, are frequently met with in the wild state, or that which approaches near to it. They are a sort of sheep which have no great value in any point of view.

Those in the greatly extended ranges of country, which comprehend Persia, Syria, Egypt, and Barbary, are a *long* or *broad tailed* breed of sheep, which are peculiar and extraordinary in a great degree, for the length and heaviness of their tails, which grow in some cases to a foot in breadth, and are of such length as to bring them to from twenty to fifty pounds in weight; which causes the necessity of their being supported, under the care of the shepherds, upon boarded carriages which have small low wheels under them, so as to prevent the animals from being galled and exhausted by carrying them. The meat of these weighty tails is commonly considered as a great delicacy, being somewhat of a nature and substance between fat and marrow, when eaten with the lean parts. There are likewise sheep of this breed or sort, which have been bred and raised on the Thibet mountainous parts, which have a wool of uncommon length and fineness, from which are manufactured the rich Indian shawls, which are of such great value, as well as some other articles of the fine and rich kinds. These *broad-tailed* sheep, and those of the *fat-rumped* kind, have, in some cases, the names of the Calmuc and Astrachan breeds or sorts given to them.

This breed is of course much valued in consequence of the fineness of the fleece, and its fitness for the production of some of the richest sorts of woollen fabrics.

There is a hairy sort of sheep which are kept in large flocks in some parts of Great Tartary, and which have the name of the *Buckharian* breed or sort. The same kind also abound in the Island of Antigua, in the West Indies. This sort of sheep is said to have been imported

from Spain into this country, and to have had coats as smooth and sleek as those of the horse, and which never at any season of the year exhibited the least appearance of a woolly or downy nature or quality. They are of course little valuable except for the purposes of curiosity and ornament in grounds.

There is a breed of this *sort* of sheep which are described as growing a compact, soft, and elastic wool, which is finely formed into frizzled ringlets. The wool in the lamb is formed into fine delicate wave-like circles, as if pressed quite close to the skin in some artificial manner; but when taken out of the ewe, or killed instantly after being lambed, they are said to be still more beautiful, being often finely marbled in a wave-like, feathered method, as in silk damask. Of these three furs, those which are most valued, are the blue, the black, and the silver gray; but of the *unborn* lamb skins, as their fine glossy furs are termed, which appear so much like silk damask, the fine black is the most esteemed, and of the most value. In order to procure these highly valued furs, the hordes of these districts provide whole flocks of male lambs when just dropped, as to kill a female, until past breeding, is held to be a high crime among these people; so that all the fur of this kind, which is brought to market, is procured from young male lambs. These people have a notion that art is required to preserve these furs in their fullest beauty and perfection, and in consequence, they have recourse to shade and protection during the excessive heat of the sun; but it has been thought by some travellers that the same breeds or sorts of sheep produce the same fine hues of equal beauty, without any kind of care or art whatever.

There is a breed or sort of sheep, too, in the island of Madagascar, which are of a good size, and well covered with a thick close pile of smooth glossy hair.'

It may probably, on the whole, be concluded, that most of the breeds or sorts of sheep, which inhabit warm climates, have coats of the hairy kind instead of those of wool, as in the more temperate and cold regions of the globe. There are, also, in other hot climates and situations, some other kinds of sheep besides these, which have hairy coats or coverings, but the nature and qualities of which are so imperfectly determined, that nothing useful can be said respecting them.

It is therefore, probably, to be concluded, that even and unmixed fine wool in sheep is the produce of proper cultivation and management in the more cold parts of the earth, rather than natural to them in their native wild states and situations; as by regular keep and proper shelter and protection in such cases, the coarse hairy parts of the coats fall off and are lost in many kinds of animals which seems probable to have been primarily the case with the fine woolled breeds of sheep in this country, as many of them when too much in-attended to, are apt to shew marks of their primitive state by the growth of coarse hair, blended and intermixed with the more fine parts of the fleece or covering. And even in the most coarse woolled sheep in high cold tracts of country, there is not unfrequently some portion of fine wool taking its growth under the coarse fleecy covering in which they are wrapped. By these different means it would seem, that animals become capable of inhabiting very different climates; as the sheep of cold countries, on removal to tropical situations, almost immediately become sickly and enfeebled by the excess of heat, and suffer the loss of their fleeces in a very short time, when they afterwards become supplied with a thin coarse covering

of short hair. Fine fleecy coverings in sheep appear more particularly the produce where cold prevails, as in most of the breeds of this country, that part of them which is the growth of the winter season, is noticed to be finer than that produced in the summer months. Excessive heat and cold seem equally to have the effect of rendering the coats of sheep coarse and hairy; but where cold prevails, there is a disposition likewise to produce a fine down underneath such hairy coverings.

In the wild sheep, and a variety of other animals that are inhabitants of cold regions and countries, the skin is covered with a short fine down, which is protected by a coat of long coarse hair that grows through it.

BREEDS OF THIS COUNTRY.

In this country the breeds and varieties of sheep are so extremely numerous as scarcely to be enumerated with any correctness or certainty. The principal characteristic circumstances, however, by which they have been chiefly distinguished, are those of their possessing horns, or being wholly without them, and from the length or shortness and fineness of the wool, as well as the situation in which they are chiefly found.

Some think that all the breeds of sheep in this kingdom may be arranged and considered under two heads or classes; those which clip the short or clothing fleece, and those which shear the long or combing wool. And that the quality of the meat or flesh in each class follows the character of the wool; the short-woolled sort being close in the grain, as to flesh, consequently heavy in the scale, and high flavoured as to the taste; while the polled long-woolled kind are more open and loose in the grain of the meat, larger in the size, and of inferior flavour.

Others distribute them under the three following general divisions:

THE MOUNTAIN BREED,

Which includes several varieties, as the *black-faced*, that range on the mountains of Wales, Westmoreland, Cumberland, Yorkshire, and those in the south-west and north of Scotland, and in the Shetland islands, the Cheviot hills, in the south of Scotland, and the north of England; and the common and forest sheep of the last-mentioned country:

THE SHORT-WOOLLED BREED,

Which includes those of Hereford, Dorset, Sussex, Norfolk, and some parts of Cumberland, and other northern counties; and

THE LONG-WOOLLED BREED,

Which comprehends all those sorts and varieties that are dispersed over the more rich and fertile parts of this country, and which are distinguished under the titles of the Durham or Teeswater, the Lincolnshire, the Old and New Leicestershires, and some others.

Others again divide them into Long, Short, and Middle-woolled kinds.

DISTINGUISHING MARKS OF THE BREEDS OR VARIETIES, AND IMPROVEMENTS OF BRITISH SHEEP.

The points or nature and form of particular parts, and various other circumstances which serve to distinguish and characterize the different breeds, varieties, or sorts, and improvements of sheep in this country, are pointed out and given in the following descriptions, as collected from the most able, attentive, and experienced store-masters, breeders, and improvers of sheep.

There are many different kinds of sheep, in so far as relates to their properties and uses; but the breeds and sorts which are hereafter considered, are probably the best and most valuable

in the several intentions of the breeder, feeder, and consumer; as well as in the use and advantages of their wool, and other parts of them.

TEESWATER BREED, VARIETY, OR SORT.

It is a sort which, in its original state, has been said to be the largest of any in the island, and to have been the most prevalent in the rich, fine, fertile, enclosed lands, on the banks of the river Tees, in Yorkshire. In this sort it is stated, that the legs are longer, finer boned, and support a thicker and more firm and heavy carcase than in the Lincolnshire kind: that the sheep are much wider on the backs and sides, and afford a fatter and finer grained mutton; but that the wool is shorter and less heavy. That the weight in the two-years old wethers is very considerable, as seen below.

In this kind of sheep, which is supposed to be from the same original stock as those of the Lincoln, greater attention seems to have been paid to size than wool. It is, however, a breed which has been supposed calculated only for warm rich pastures, where they are kept in small lots, in small enclosures, and well supported with other food in severe winter seasons. But though the produce in weight of mutton be large, yet from their requiring so much longer time and richer keep, and being admitted in so much smaller proportions on the acre, they are not, upon the whole, so profitable, even in situations where they can be kept with the greatest chance of success, as the smaller or more quick-feeding breeds. But this has not yet been so fully or fairly put to the trial as it should have been.

In the ewes there is, however, a property of much consequence; which is, that in general they are very prolific, bringing forth two and frequently three lambs, and in some cases a greater number each at one time. It is said that this breed is now nearly worn out and lost, or greatly reduced in size. Indeed it is a variety which has been little attended to, but it is supposed, that if improved by proper crossing, it would answer and pay well in districts where it could be well supported. It has been supposed on good authority that an useful kind is capable of being bred by crossing the ewes of this breed with Dishley rams in a careful manner; and it is believed that by the use of these, and those of the Northumberland kind, the quality of the wool and the mutton has not only been greatly improved, but the quantity of bone and offal much lessened; and, at the same time, the fattening property considerably increased, they becoming fatter at two years old than the others are at three. The wethers of this improved sort generally sell unshorn at two years old at very high prices, and weigh great weights.

AT TWO YEARS OLD IN WETHERS.

Weight *per* quarter, in old sort, from 25lb. to 35lb., and up to 55lb., or more in some cases.

Weight *per* quarter, in improved sort, from 24lb. to 30lb., and upwards.

Mutton in perfection mostly at three years old.

Quality and use, much as in the Lincoln sort, but perhaps rather superior.

These, originally great-weighted valuable sheep, seem to have been much lessened in their size and in the quantity of their wool by their being too much crossed with those of the Dishley kind, but at the same time they have been much bettered in some of their useful properties, as their disposition to fatten more readily, and to consume less food. They are a very profitable and useful kind of sheep in some situations and cases, which should not be lost sight of, as they produce a great weight of good mutton and much wool.

LINCOLNSHIRE BREED, VARIETY, OR SORT.

This sort of sheep are characterized by their

having no horns; white faces; long, thin, weak carcases; thick, rough, white legs; bones large; pelts thick; slow feeding; mutton somewhat coarse grained, and the weight of the quarter in ewes and in three-year old wethers rather considerable; the wool from ten to eighteen inches in length.

This variety or breed of sheep is chiefly prevalent in the district which gives name to it, and in some other rich grazing ones in the same neighbourhood and a few other places. It is, however, supposed by some that it is now so generally improved by new Leicester tups, that the sheep are probably in a great measure free from those defects of the old breed which have been so much complained of, namely, slow feeding, from a looseness of form and too much bone and coarse-grained flesh. It is not, however, to be denied that a good old Lincoln has ever been, and probably still continues, a great favourite at Smithfield market, the flavour of the Lincoln mutton being generally held superior, as more savoury than the Dishley.

The improved Lincolns have finer bone, with broader loins, and are more closely set in the carcases, being now among the best, if not actually the best, long-woolled sheep stock we are in possession of.

AT THREE YEARS OLD IN WETHERS.

Weight *per* quarter, in old sort, 20lb. to 30lb., and upwards.
Weight *per* quarter, in ewes, from 14lb. to 20lb.
Mutton in perfection, partly at two and partly at three years old.
Quality of, good in general.
Time of using it, from early spring to autumn.

This is, however, a sort of sheep which is supposed to be only capable of being made fat on the richest marsh grazing lands; and that in such cases it may probably be kept till three years old with greater profit than the new Leicester kind. The proportion of bone to mutton is not inconsiderable, and the latter not very fine in quality. The principal excellence of the breed is in the large quantity which it affords, and this pays for their being kept longer before they are fattened. Such breeds, however, as feed quicker will be found to be more advantageous in a great number of cases.

The old Lincolns are to be considered as the original kind of all the heavy sheep in this country. They have undergone some change in most cases by means of the new Leicester breed having been so generally intermixed with them for some length of time; but it has since been found by experience that this mixed sort have not consumed any much less quantity of food, or have been kept in any greater numbers, upon the acre of land, than the original heavier sort; while, in the mixed state, they have become more tender and have required being killed somewhat sooner than those of the old sort; and thus coming lighter to the scale, they have supplied a less quantity of mutton than would have been the case with the other kind, thereby raising the price to the consumer, and in this way to have produced not a little injury and disadvantage to the community in general.

The best old heavy sort, therefore, as giving the largest quantity of meat, with the greatest weight of wool, and being capable of being fed in a good proportion on the acre of the better sorts of marsh and other lands, are probably the most profitable and useful of any on such suitable sorts of ground. They evidently sustain mischief and disadvantage in several ways by being too much crossed and mixed with the other sorts; for though the form and some other properties and qualities of them may be much improved, the effects in other ways, as on the wool and other products, are such as to induce many to prefer the heavy pure unmixed

breed of this sort of sheep as being the best and most beneficial.

DISHLEY OR NEW LEICESTER BREED, VARIETY, OR SORT.

This improved breed of sheep is readily distinguished from the other long-woolled sorts by having fine lively eyes, clean heads without horns, straight broad flat backs, round or barrel-shaped bodies, fine small bones, thin pelts, and a disposition to make fat at an early age; to which some add a superiority in the fineness of the grain and the flavour of the mutton to that of other sheep of the large long-woolled kinds. The weight of the quarter in ewes of three or four years old, and in two-years old wethers, pretty large; the length of the wool from six to fourteen inches. Some breeders, however, distinguish them as having a fulness of form and substantial width of carcase, with a peculiar plainness and meekness of countenance; the heads long, thin, and leaning backward; the noses projecting forward; the ears somewhat long and standing backward; great fulness of the fore quarters; legs of moderate length, and the finest bone; tail small; fleeces well covering the bodies, which is of the shortest and finest of the combing sorts of wools, the length of staple six or seven inches.

The fore flank, or the flap of skin or fat appended to the ribs, and the inferior part of the shoulder, is, it is observed, remarkably capacious in this sort of sheep.

It is believed by some breeders that new Leicester mutton is the most finely grained of all the large and long-woolled kinds of sheep, but of a flavour bordering on the insipid; and that it is reported, and with the strongest probability, from the appearance of the stock, the fineness of the wool, and the grain of the mutton, that a Ryeland cross was a prime instrument in the Dishley improvement of sheep; though probably the root or foundation was Lincoln. In the ordinary or gradual course of improvement or alteration of form, it must, it is supposed, have taken a long time and vast pains to have moulded the animals into that artificial and peculiar shape which distinguishes this remarkable variety of sheep.

The great advantages of this sort of sheep have been stated to consist in producing a better profit to the storemaster in proportion to the quantity of food consumed than most other sorts; in being more perfectly formed, and, consequently, more disposed to fatten quickly; in containing a much larger proportion of meat on an equal weight of bone; in thriving well on such pastures as would not support other sorts of the same size; in being capable of being kept or fattened in larger proportions to the acre than other breeds of the same size of carcase; in the wool being more valuable, though less in quantity; in their being ready for the butcher in the early part of the spring instead of the autumn, by which there is a considerable saving in the summer's grass; and in the mutton, from the closeness of its texture, keeping longer than that of other equal-sized breeds of sheep.

On the other hand, that the disadvantages of this breed are the fattening too much, and the mutton in consequence becoming less delicate in its flavour than in that of other breeds that require greater length of time in the process; the deficiency in the quantity of wool, and their not being calculated for the fold. It has also been suggested that their peculiar rounded form, from throwing much of the fat on the external parts, prevents their tallowing well internally; and that from their great propensity to fatten, they are liable to early decay, becoming old sooner than the other breeds.

Notwithstanding, there can be no doubt but that it is a valuable breed on pastures that are adapted to it, as is evinced from its rapidly making its way into different districts of the kingdom; but some breeders imagine that the sheep are too small, and that, from the thinness of their skins or pelts, they may not be so capable of bearing cold, a supposition which experience, however, does not appear to support.

Some who object to the Leicester or Dishley breed chiefly from its too great propensity to fatten, which it is thought also abates the procreative and milking powers, say that pure Dishley sheep are by no means the most prolific nor the best nurses; and that now it is no longer supposed that new Leicester sheep are able to subsist or thrive on the shortest commons. In fine, the merits of this stock as an improving cross, their grand point of utility being so undeniably great, their disadvantages have, it is supposed, been overlooked, and comparisons been usually made with such only as had a strong need of improvement, in which the new Leicesters of course were sure to excel. And further, that though this Dishley cross has made its way into every part of this island, to the Land's End, to the bottom of the Welsh mountains and of the Scottish highlands, to Ireland, and even to Russia, its general success has been attended with various particular instances of failure, a remarkable one of which has been given in respect to the Bampton, or west country long-woolled sheep. The cross is sometimes very injudiciously used with short or carding woolled stock, excepting where the intention is only forward lambs. On stock naturally good and improving, this peculiar effect of the new Leicester cross has resulted, the improved have considerably surpassed in the most valuable properties their improvers. Of this many examples may be seen in the improved Lincoln, Northumberland, and midland county sheep.

AT TWO YEARS OLD, IN WETHERS.

Weight *per* quarter, from 20lbs. to 30lbs., and upwards.
Weight *per* quarter, in three-year old ewes, 18lbs. to 20lbs., and more.
Mutton in perfection at two years old commonly.
——— Quality, tolerably good.
——— Time of using, from June to the end of October.

The progressive value of new Leicester sheep is stated as very great in the account of the Agriculture of Lincolnshire, in which the advantages and disadvantages of the breeds of that county and the former are somewhat examined and considered. And a distinction is considered necessary to be drawn between the rich south-eastern district and inferior soils; as upon the former the information is strongly, it is said, in favour of the Lincoln sort. However, in general, it should be observed that the new Leicesters were then spreading very rapidly over the county, probably faster than they have done in any other, one or two only excepted, which may be attributed to the general goodness of the soil; for this breed makes a much more respectable figure here than it has done in various trials made in counties inferior to it in soil; and the breed driving out the Lincolns so much as it has done in the poorer parts of it is a fact that unites with this circumstance. The true Lincoln is a larger sheep, and with a longer wool, and therefore demands better pasturage; where it finds such, there the old breed remains, subject, perhaps, to little more change than fashion may cause. Upon inferior land the Leicester establishes itself; and upon land still inferior in other counties, experiments prove unsuccessful for the same reason, that of the necessity of having a smaller size and shorter wool.

Some of the original pure long-woolled polled breed of sheep are still to be met with in the

midland districts, which are a larger-boned, longer-formed, deeper-coated, and more coarse stock than the improved sort; and that, from the coarseness and larger size of the head and neck in the old sort, the ewes lamb with more difficulty than in the true Dishley breed.

The proper new Leicester sort of sheep has been found a very advantageous breed on the stone brash lands in Oxfordshire; and some farmers there think that no other sort comes nearly up to them when all their valuable properties are taken into the account.

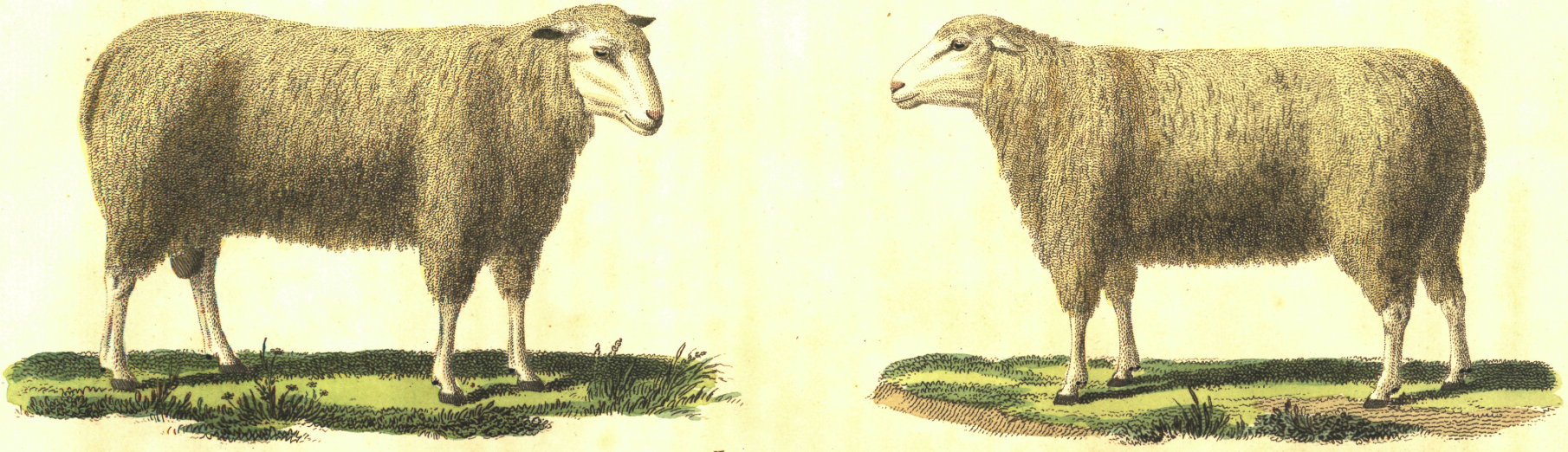
This is a breed or sort of sheep which, in the well-fleshed, though less fine, kinds, is productive of much utility and advantage in bettering the forms, and promoting the early fattening dispositions, of other breeds and kinds of large long-woolled sheep; as there is probably no other sort which has equal power in these respects. At the same time, it must be admitted, that by rendering the breed too thinly fleshed, and too fine in some of its parts, and by crossing too much and too indiscriminately with it, great injury and mischief may, in some particular instances, have occasionally been the consequence.

The great use and benefit of this breed, besides those already stated, seems to be, the early production of a large quantity of useful mutton of the less fine, but more fat kind, and the affording wool in finer and more fit sort for some purposes, though less in weight. There is a necessity for disposing of the wether part of this breed of sheep at the early age of two years, as they then bear the best profit, and when kept longer they are liable to become too fat for the better sort of tables. This early maturity may be turned to great advantage in many cases. On the less rich sorts of land, where there are roots, and grass, and seed-crops, in connexion with such pastures, this breed will bring as much or more profit than any other.

COTSWOLD, OR GLOUCESTER, BREED, VARIETY, OR SORT.

This breed of sheep is of the fine combing-wool sort, deriving the fineness of their fleece from the same source as the new Leicesters. This part of that county, formerly, and within memory, bred small fine-woolled sheep, of the Ryeland kind, which, in past-times, had been cotted, but the practice was discontinued. These sheep being judged too small for the improving state of the country, have been, by gradual crossings with midland long-woolled rams, chiefly Warwicks, completely changed from short to large long-woolled stock. The better sort are said to answer this description: long coarse head, with a particular blunt wide nose; a top-knot of wool on the forehead, running under the ears; rather long neck; great length and breadth of back and loin; full thigh, with more substance in the hinder than fore quarters; bone somewhat fine; legs not long; fleece soft, like that of the Dishley, but, in closeness and darkness of colour, bearing more resemblance to short or carding wool. Although very fat, they have the appearance of sheep that are full of solid flesh, which comes heavy to the scale. It is said, that some of those sheep have reached a great weight in the quarters, at two years and a half old, giving from ten or twelve to fourteen pounds of wool each sheep, which, when fat, are indubitably among the largest breeds in this country. A single dip of the new Leicester, it is said, gives the Cotswolds a fulness in the fore quarters; but any farther cross of that sort, it appears, diminishes their size. The strange cross with the Wiltshire horned sheep, that has been recurred to in some parts, has been for no pos-

Improved Leicestershire & Lincolnshire Breeds.



Leicester.



Lincoln.

London, Published by Thos. Kelly, *17, Paternoster Row, June 1, 1822.*

sible good purpose, either to the carcase or wool; and it is probable, supposing such large stock profitable, that the chief alteration required by the Cotswolds is, to encourage length of staple in their fleece or wool.

Native Cotswolds, if any where found, are a long sort of sheep, which want fulness in the sides; they are sharp in the chine, not full in the fore flank, coarse in the bone, not straight but good in the hind quarters; they will not fatten so early as when crossed; and in respect to wool, in the two-shear wether, are three and a half fleeces to the tod. It is contended, that the new Leicesters are calculated to correct all these defects, and to bring a greater disposition to fatten. It is said, that between all Cotswold, and all Leicester, the average difference of wool is three pounds.

AT TWO YEARS' OLD, IN WETHERS.

Weight *per* quarter, in improved sort, from 20lb. to 40lb. and 50lb., or more.
Weight *per* quarter, in old sort, from 28lb. to 32lb. or more.
Mutton in perfection, at two years' old, commonly.
——— quality of, much as in Lincolns.
——— time of using, nearly the same.

In this breed the ewes are usually put to the tup so as to have lambs at two years' old, mostly producing two lambs each, in the proportion of nearly one-third of the whole, when kept well, which should always be the case. Those of the proper improved sort may be kept for breeding till three or four years' old. But the wethers afford most profit when killed so early as two years' old, as they are apt to become too fat when kept longer.

In many parts of Oxfordshire, the Cotswolds or Gloucesters, and the half Leicesters and half Gloucesters, and other mixtures of these breeds, are considered as very excellent sorts of sheep-stock; they are of a good size, bear plenty of wool, and stand penning well. It is thought, however, by some farmers, that penning or folding is not beneficial, as more and better sheep may be kept without it.

In Devonshire they have succeeded in the cross of new Leicester upon the Cotswold, the equal breed of which is attempted to be preserved as much as possible. Wethers of this kind, at eighteen months old, will average nineteen pounds the quarter, and seven pounds of unwashed wool the fleece. When kept on for another twelvemonth, the age at which they are mostly killed in this county, this cross will attain the size of twenty-five pounds the quarter, and yield nine pounds of wool to the fleece. This wool is allowed, by the staplers, to be one penny the pound superior to that of the Exmoor, Bampton, South-Devon, and Dartmoor sheep, yet still the common price is only allowed for it. In the young wethers of this breed, the loose fat is stated to be nine pounds with nearly three pounds of kidney fat on each side. The larger wethers are said to produce thirteen pounds of rough fat and four pounds of kidney fat on the side.

In this breed, which is large and heavy in the carcass, and full in the fleece, with a degree of fineness, there is the combination of a good and useful form, with a weighty well-mixed sort of mutton, that greatly suits the general demand. It may, of course, be considered as a very useful and profitable sort of sheep, where the nature of the soil and keep are sufficiently dry and abundant to bring it to full perfection; but in other cases it cannot be so properly employed, whatever the effect of crossing it with other sorts of sheep may have been. It is, however, a kind of sheep which, in many situations, deserves to be well attended to, as possessing many properties that cannot fail to render it beneficial, and of great value in many respects.

ROMNEY-MARSH BREED, VARIETY, OR SORT.

This has been described as being a breed of sheep without horns; white faces and legs; rather long in the legs; good size; body rather long, but well rounded or barrel-shaped; bones rather large; and the weight of the quarter, in fat wethers, at two years' old, usually large, as from twenty-two to twenty-eight pounds or more. In respect to the wool, it is fine, long, and of a delicate white colour, when in its perfect state. On this marsh, twenty pounds of wool are supposed to be produced by the sheep on the acre. In this breed there is a property of arriving at the state of fatness at an early age, as well as that of producing a large fleece of fine long combing wool; of course, it is a valuable sort: however, from the size and great weight of the coat, it is only capable of being supported and fattened on the rich kinds of marsh-pasture, such as those which extend from Hastings to Rye, in Kent. Some graziers there find it more beneficial than the South-Down, the marsh wethers fattening more quickly. The wool afforded by such fat wethers is about six pounds, and in breeding ewes five pounds, but not equal in quality to the wool clipped from shearlings. It has been said, that a convincing proof of the great value of this breed of sheep, as well as of the land on which they are fed, is seen in the manner of stocking, which, in tegs, is from four to seven on the acre, in fattening wethers from six to eight, in barrens from two to three, and in couples three, which is certainly a great stock.

In all probability, this is a breed which might undergo much improvement, without crossing, by proper care and attention, and by being less exposed in the winter season.

The old Romney-marsh breed of sheep were remarkable for having large heads; for being large, long, and tub-bellied; also for being large in their bone, long in their legs, and coarse in their wool; which form is still held in estimation by some, in consequence of improper prejudices, to the great injury of the grazier and community in general; but the pure breed of this sort is said to be distinguished by a thickness and length of head, a broad forehead, with a tuft of wool upon it, a long thick neck, a great length and thickness of carcass; being flat-sided, and having a sharp chine, tolerably wide on the loin, but the breast narrow, not deep, the fore quarter not heavy or full; a good cleft; the thigh full and broad; the belly large and tubby; the tail thick, long, and coarse; the legs thick, with large feet; the muscle coarse, and the bone large; the wool long and not fine; coarsest on the breech: the sheep prove good, and are great favourites with the butchers. This description, however, is not now so applicable as it was some time ago, when most of them had horns It is, however, noticed, that the introduction of the Leicester breed has very perceptibly altered the form and properties of the original breed or stock of this tract, so that in a few years it will scarcely be discernible. It is, indeed, the opinion of some breeders, that it has been injurious to it, in reducing the size and value of the animal, as well as the quality and quantity of the wool, though it has still many advocates, and has certainly contributed much, in several ways, to its improvement. The principal objections which the graziers of this marsh seem to have to the mixing of the Leicesters with their own breed, are, that they have seldom or ever twin lambs, which are very desirable and beneficial in this situation; that the lambs are more tender, and, of course, a greater loss liable to be sustained, especially in an open exposed tract of this sort; that their lambs do not winter so well as those

of the native breed upon the uplands; that they are much less hardy, consequently cannot stand cold and hardships so well, which is very disadvantageous; that their wool is not in such abundance, or so valuable; that there is a want of proof in them, which renders them a great deal less saleable to the butcher: this may, however, be no disadvantage to the breeder or grazier, as it shows other more valuable properties and dispositions; and that they are too short in their bodies and legs, so as to stand too low in their pens at the market. These are, however, probably improved valuable properties, which must be rather beneficial than hurtful. Some improvement has, however, certainly been given to the marsh breed by the Leicester cross, as those of smaller and less coarse heads, a greater depth of carcase, and shorter and less coarse legs, better symmetry or form of several different parts, as well as of the whole animal in general.

Indeed, there can be no doubt, but that this breed has been greatly benefited by the introduction of the new Leicester sort; and it is probable, that it has not depended so much upon selection as the use of this new variety; as though the cry in the market is for the marsh kind, that form is not carefully improved, and by no means preserved, although something of it may still exist. It is said, that something of the South Down sort is likewise discernible in this breed.

This is a sort of sheep which is thought to be highly valuable for cold exposed situations, as being easily bred and standing in need of no artificial food in the most severe winters, except a little hay; they are very hardy for their size, have now many improved qualities, and may probably be made the most profitable of any for rich pastures, as affording the largest proportion of meat at the least expense.

AT TWO YEARS' OLD IN FAT WETHERS.

Weight *per* quarter in old sort, from 22lb. to 28lb. and 30lb. or more.

Weight, general average of, in wethers of the improved sort, from ten to twelve stone.

Weight, general average of, in ewes, from 9 to 11 stone.

Mutton in perfection, mostly at two years' old.

——— quality of, pretty good,

——— time of using it, for several months in the summer and afterwards.

These large sheep are of much value and importance in all rich, bleak, and exposed lands, where there is plenty of fine, short grassy herbage, that renders their keep easy and their fattening expeditious, as they give much increase and weight of useful meat, with a tolerable fleece of wool, and become ready for use at a very early period, especially in their more improved state.

DARTMOOR, DEVONSHIRE, BAMPTON, OR NOTT, BREED, VARIETY, OR SORT.

This is a breed of sheep which is chiefly distinguished by having no horns; white faces and legs, thick necks, backs narrow, and backbones high; sides good, legs short, and bones large, but probably without any other material objections, being a variety of the common hornless sort. The weight of the quarter in the ewes, on the average, is large; and in wethers at two years' and a half old, very considerable. Length of wool much the same as in the Romney-marsh breed. This variety is prevalent in the district from which it has derived its name, and is supposed to have received considerable improvement by being crossed with the new Leicester or Dishley good improved sort in a careful manner.

Besides the forest from which it takes its name, this breed is met with in some other parts of the county. The Dartmoor wethers will average nearly twenty pounds the quarter, and produce from four pounds and a half to six

pounds and a half of unwashed wool to the fleece. Though this breed of sheep does not feed so quickly, when put to good keep, as the new Leicester sort, yet, when fat, they constantly prove the very best mutton, and never fail to command a superior price. They also stand the climate in a favourable manner, and the ewes are good nurses.

DEVONSHIRE SORT.

Formerly the old Devonshire dun-faced Nott sheep were held in high estimation, as a native breed of some parts of this county. It is, however, a crooked-backed, flat-sided, coarsely-boned and woolled animal, but which has been much improved by crossing with the new Leicester sort. Its principal defects are by these means removed, and a greater disposition to fatten at an early period given; while at the same time, however, the fleece, as well as the weight of the carcase, have been lessened, the former from ten to eight pounds of unwashed wool the fleece, and the latter from twenty-two to nineteen pounds the quarter. In order to recompense which, the animal comes to market four months earlier; the wethers at two years' old with advantage; that is, after being twice shorn as sheep, and once as lambs.

BAMPTON SORT.

In the Bampton Nott breed, the wethers will, at twenty months old, weigh twenty-two pounds the quarter, and shear six pounds and a half of wool to the fleece; also the same sheep, well wintered, and kept on for another twelvemonth, will average twenty-three pounds the quarter, and yield eight pounds of unwashed wool to the fleece; the price of the wool is about one shilling per pound. The first cross of this breed with the new Leicester is fast growing into great esteem in this district, in consequence of its improving the form, and bringing the animal three months sooner to market; but though so far useful and desirable, any more of that blood is thought disadvantageous, as rendering them too tender while young, and requiring too much care and nursing.

The Bampton Nott, crossed with the new Leicester, is also much approved of in several parts of the county, especially when carried to the fourth degree, or four parts of the Leicester to one of the native Nott. This cross, it is said, comes still earlier to market, and at two years old will generally average twenty pounds the quarter, and eight pounds of yoak wool to the fleece. Also the old Leicester cross upon the Bampton makes a large and handsome animal, which feeds kindly and tallows well within. The wethers of two years old will average, with advantage, thirty pounds the quarter, and shear ten pounds of yoak wool to the fleece. It is much valued in some places; but the new Leicester cross, upon the same sheep, will in some situations bring forward wethers at twenty months old, weighing twenty-two pounds the quarter, with a shear of eight pounds of yoak wool to the fleece. This sort is highly valued in different parts of this county. The half Bampton cross is more hardy than the new Leicester sort, and suits some places better.

AT TWO YEARS AND A HALF OLD, IN WETHERS.

Weight *per* quarter, in Dartmoor sort, from 20lb. to 30lb. or more.

Weight, average, in ewes, 20lb. or more.

Weight *per* quarter, in improved old Devons, from 18lb. to 20lb.

Weight *per* quarter, in Bampton sort, at two and three years old, from 20lb. to 22lb., and 23lb.

Mutton in perfection, mostly at two years old.

——— quality of, very good.

——— time of using, the latter part of summer, and until the more advanced parts of winter.

These are sorts of sheep that may be found of considerable use in many cases for their fine mutton, as well as their wool, as where the more heavy long-woolled breeds are improper or incapable of being kept with propriety, they will, in some of their crosses, be proper for giving the most advantage that can probably arise or be derived from such sorts of keep.

EXMOOR BREED, VARIETY, OR SORT.

This variety is characterized by having horns, white faces and legs: by being very delicate in the bone, neck and head, or what is sometimes denominated, deer-necked, by the form of the carcass being indifferent, narrow, and flat-sided. The weight of the quarter in wethers at two years and a half old is rather large, but the weight of wool much less than in the Devonshire breed. It is a small sort of long-woolled sheep, principally produced on or in the neighbourhood of the moor from which it takes its name, which is in the northern extremity of the county. Some graziers suppose, that in their present state these sheep are by no means to be considered as a profitable sort, either in what relates to flesh or wool, on which account it would probably be to the interest of the county to change them for the best fine-woolled breed. Mr. Billingsley has observed, that this breed of sheep are frequently kept two or three years, merely for the annual profit of their fleeces, which often do not exceed more than four pounds in weight; but that from their being capable of being kept upon very bare and indifferent pastures while young, they are supposed by many sheep farmers to be a very profitable sort of stock. Such are the contrary opinions of store-masters in respect to this sort of sheep; it is, however, allowed, that the Exmoor breed is a hardy sort of sheep; and, under the disadvantages of cold and wet, the ewes, in lambing, are superior to the Bampton Nott kind.

Before the cloth manufacture of the county of Devon was transferred to Yorkshire, the wool of this breed was much in demand by the clothiers of several different places. The fattened wethers, at three years old, will usually weigh about fifteen pounds the quarter, and average four pounds and a half of washed wool to the fleece. Attempts have been lately made in different places to improve the wool of this breed by a cross with the Merino or Spanish ram, and the results of the trials are,

	Wool. lbs.		*Price.* s.	d.		*Amount.* s.	d.
Quantity and value of native fleece,	4½	at	1	1	per lb.	4	10½
First cross with the Merino,	5	—	2	2	——	10	10
Second cross on this produce,	5	—	2	9	——	15	9
Third cross, on same	5	—	3	5	——	17	1

By this improvement of the fleece, the carcass is also supposed to be rather advanced than the contrary.

In the cross of the old Leicester upon the Exmoor breed, the wethers, which are the produce at about three years old, average about twenty-four pounds the quarter, and carry about six pounds and a half of yoak wool to the fleece. The Exmoor sheep have also been crossed with the new Leicester, the wether produce of which, at two years old, will weigh eighteen pounds the quarter, and yield six pounds of unwashed wool to the fleece, at nine pence per pound. Much loss is often sustained in this last cross at the time of yeaning, in consequence of the great size of the shoulders of the lambs retarding or preventing their exclusion.

AT TWO YEARS AND A HALF OLD IN WETHERS.

Weight *per* quarter, from 15lb. to 18lb. and 20lb.

Weight *per* quarter, in improved Spanish cross, from 18lb. to 20lb.

Weight *per* quarter, in old Leicester cross, at three years, from 20lb. to 24lb.

Weight *per* quarter, in new Leicester cross, at two years, from 16lb to 18lb.

Mutton in perfection at two and two and a half years old.

——— quality of, good.

——— time of using, rather longer than in the above sort.

This is a hardy sort of sheep, that may be useful and beneficial in some instances, in such short bare sorts of moory keep, standing such feed and the exposure better than some other breeds; but the unnatural practice of crossing them with fine-woolled sheep may, in all probability, be ultimately attended with disadvantage, as being hurtful to the quality and habits of them in some respects, and tending to render them more tender, and less proper for being kept on such pastures as they are usually supported upon.

MIXED SORTS OF LONG-WOOLLED SHEEP.

There are some other sorts of mixed long-woolled sheep, as the Kents, Warwicks, and some others, described below.

In the Kents, which are a middling kind of sheep, that are not horned, there is a good length of carcass, but without great breadth on the back; which width, however, is continued from the shoulders to the setting on of the tail, in an equal or better manner than in some other sorts, which is a very beneficial quality; they are rather long in the leg, standing somewhat high, and are better in their hind quarters, with longer rumps than some other improved sheep; they carry a fine wool or coat of the combing kind, not of great length. In the best of them, when suitably fat for general use, the weight of the quarter is, on the average, from about twenty to twenty-two pounds, which is not great for the length of time that they are in arriving at perfection. They are very inferior to many of the heavier long-woolled sorts of sheep.

The wool in these sorts of sheep is finer, but shorter, than in the heavy kinds, and useful for particular purposes, as those of hosiery, and other such articles.

IN THE KENTS.

AT TWO AND THREE YEARS OLD, IN WETHERS.

Weight *per* quarter, from 21 to 55lb. and upwards.

Weight in ewes from 18 to 30lb. and upwards.

Mutton in perfection, partly at two, and partly at three years old.

——— quality of, as good as the other large polled sheep.

——— time of using it, the latter part of the year.

The Warwick sheep, which are a mixed sort of this kind, are a better formed, more weighty, and more equally-sized sheep, and are more useful, and afford a better profit in all cases, where they are suitable.

IN THE WARWICKS.

AT TWO AND THREE YEARS OLD.

Weight *per* quarter, in wethers, from 23 to 50lb. or more.

——— *per* quarter, in ewes, from 20 to 45lb.

Mutton in perfection, partly at two, and partly at three years old.

——— quality of, as good as in the other large long-woolled sorts.

——— time of using it, much as in the Lincoln sort.

In the lower parts of Northumberland there is a mixed sort of sheep, produced between the large Teeswaters, Lincolns, Cheviots, and probably some other sorts, which, for the most part, are said to be a very inferior kind of sheep of the longer-woolled sort, which want better form, and more hardiness, to be rendered profitable, but which have very much supplanted the muffed kind, which were formerly very common in those situations, being in some degree better than them.

IN THE NORTHUMBERLANDS,

AT TWO AND THREE YEARS OLD.

Weight *per* quarter, in wethers, from 20 to 45lb., and upwards.

Weight *per* quarter, in ewes, from 18 to 30lb., and more.
Mutton, in perfection, partly at two, and partly at three years old.
——— quality of, tolerably good, and well mixed in lean and fat.
——— time of using it, the latter summer months.

In different parts of Oxfordshire, there is a mixed sort of sheep, probably between the Berkshire, Dishley, and some other of the less long-woolled kinds, which are a tolerable sort of sheep for some uses,

IN THE OXFORDS.

AT TWO AND THREE YEARS OLD.

Weight *per* quarter, in wethers, from 22 to 48lb.
——— *per* quarter, in ewes, from 16 to 30lb.
Mutton, in perfection, at two and three years old.
——— quality of, rather superior to other large sorts.
——— time of using it, the latter summer season.

It is a breed of the less long-woolled sorts of sheep that may be found profitable in some places, where artificial food is much raised in addition to the pastures, and where the practice of folding is still in use; as their chief utility is in their weight, and their standing the fold so well. By properly crossing with new Leicesters, they may be much bettered in their early and quick fattening, in which they seem to be deficient.

BERKSHIRE BREED, VARIETY, OR NATTS.

This breed is described as having considerable length of carcass and bone, being straight made, like the horse, full fore flank, Roman faced, with distinct black spots, high on the leg, and a thick fleece of considerable length. It is supposed that they class with the long-woolled breeds, and probably bear some affinity to the breed of Oxfordshire, which is understood to be a peculiar variety.

The particular qualities of the Berkshire Natt breed of sheep seem to be, its great size, height on the legs, and weight when fattened. This breed appears, contrary to the opinion of some, well suited for the strong low lands of its native district, though the South-down sheep are fast supplanting it in many places, probably without sufficient experience of them in such situations. In contrasting them with the horned Wiltshire sheep, it has been found that the polled Berkshire, or Natt sort, are as certainly more properly adapted to the low and cold lands, as they are proved to be more hardy for the fold, to fatten sooner, and to be less liable to injury from the fly than the horned sheep. When fat, the sheep vary as much as from fourteen to forty pounds the quarter in weight. These polled or Natt sheep are, however, not of so large a size as the horned sort of the same district. The fleece of this breed of sheep is not fine, and, on the average, it will take eight of them to a tod of wool. The meat is rather coarse, as in all large breeds of animals.

The utility of crossing this breed is by no means well decided: some advising to breed from the best, but to cross for fattening. Crosses are, however, very common between many different sorts, as between the Natts and the Wiltshires, the Cotswolds, the Leicesters, and different mixed breeds. The Berkshire Natt breed is much valued in some parts of Oxfordshire, especially for regular breeding, as well as for standing the fold. They are strong, active, and able to travel, and fold unusually well; they are, however, long in fattening. The cross with the Leicester improves them considerably; still they are fast giving way to the South Down and some other breeds.

AT TWO YEARS OLD, IN WETHERS.

Weight *per* quarter, from 20lbs. to 25lbs., or more.
Weight *per* quarter, in ewes, from 14lbs. to 20lbs.
Mutton, in perfection, at two years old.
——— quality of, very indifferent.

Mutton, time of using, in the early winter and spring months.

WILTSHIRE BREED, VARIETY, OR SORT.

This sort has sometimes the title of *horned-crocks* given it, and is distinguished by having a large head and eyes, aquiline nose, wide nostrils, horns bending down the cheeks, colour all white, wide bosom, deep greyhound breast, back rather straight, carcass substantial, legs long, bone coarse, fine middle wool, very thin on the belly, which is sometimes bare. The basis of this breed is, without doubt, the Dorset, enlarged by some long-woolled cross; but how the horns come to take a direction so contrary, it is not easy to conjecture; it has been sometimes imagined, that it must be the result of some foreign, probably Tartarian, cross. The old Hertfords were supposed a kindred breed with the Wiltshire; but at present the few of this kind bred in Hertfordshire are of a smaller size, with longer and coarser wool.

These large and leggy Wiltshire sheep work well in the fold, and have always had the character of good thrivers at corn, oil-cake, and the best meat, making very large mutton, and very deep in flesh, which is high-flavoured, yielding the dark-coloured gravy. It has been said, that the breed is every where on the decline, generally supplanted by the South-downs, of which the farmers find they can, on the same quantity of land, keep more than one and a half, for one of the Wiltshire sort; the former, moreover, producing both better mutton and better wool. Many, however, are still partial to them. The disease called the *goggles* is believed by some to be peculiar to the Wiltshire sheep. It has been stated, that this breed has been long used, more or less, in the counties bordering on Wiltshire, and in Surrey, Kent, Hertford, Essex, and Middlesex; but that it is a breed not worth preserving; and that perhaps the only thing to be done with it to advantage is, to cross it with the Merino. The Hampshire variety of this breed is asserted, but for what reason is not known, to be more hardy. This breed is, notwithstanding, still much esteemed by some graziers, in most of these places.

These large sheep, wherever there is plenty of artificial food raised in combination with that of a tolerably good pasture kind, are very useful as well as profitable, from the great weight of good mutton which they produce in a ready manner, from their answering the purpose of the fold so well in the heavier sorts of land, and from their wool being tolerably good and useful for such purposes as that of greater length is not adapted for.

AT THREE YEARS OLD IN WETHERS.

Weight *per* quarter, from 25lb. to 30lb. and upwards.
Weight *per* quarter, in ewes, from 20lb. to 25lb.
Mutton, in perfection, at three years old.
——— quality of, very good.
——— time of using, from Christmas to the spring.

It has been observed, that in Norfolk the Wiltshire sheep have proved, in various trials, an unprofitable breed, as well as the Norfolks; but it is remarkable, that many practical and experienced store-masters are of opinion, that for turnips, no sheep pay better, if so well. In Hertfordshire, many who turnip-feed adhere to that breed, who admit the South-Downs to be a superior sort for grass feeding.

HEREFORDSHIRE, ROSS, OR RYELAND BREED, VARIETY, OR SORT.

This is a sort which is characterized as having no horns, white legs, and faces; by being small in size, and by the wool growing close to the eyes; by the carcass being rather well formed; and by the excellence of the mutton; weight in the quarter tolerable; wool fine and short; the lean poor-fed sheep producing the

finest. It is the true breed of this sort of sheep which is properly denominated Ryelands. In the account of the agriculture of that district, they are said, in symmetry of shape, and the flavour of their meat, to be superior to most flocks in the country. They lamb in February and March.

It has been observed, that this breed is remarkably easy in respect to food; but that, in its management, it requires cotting in the winter season, and being fed with hay or peas-haulm. In some cases, they are housed all the year round in the night-time. The cots are low covered buildings, proportioned to the extent of the flocks. And it has been stated, on the first authority, that the cotting materially contributes to the health of the animal, and the fineness of its fleece. The quantity shorn from each of the small original breed does not average more than two pounds; but the quality is such as almost to rival that imported from Spain. The price has often been as high as thirty-three shillings the stone, of twelve pounds and a half, untrinded, when the coarse wool has brought but ten or twelve shillings. They are supposed to fatten the best at four years old. The Archinfield or true Herefordshire breed, afford the finest wool, except the Spanish. It is suggested by Mr. Knight, that the disposition of sheep to fatten in the north-west part of that district is in proportion to the fineness of the wool; but he is not certain of its being so in this breed; however, it seems to him, that where the wool is close and fine, there are many advantages; and less nourishment is drawn from the body in its support than in the contrary case. The long coarse-woolled fleece admits the rain more, and by dividing on the back, lets it down to the skin. It also takes in a larger weight of water which must still further inconvenience the animal already heavily loaded. The fine close fleece of this breed admits the water with difficulty, even when immersed in it in washing, and is never wet through by rain. On account of the closeness of the texture, it only lodges on the outside, and is easily removed by the animal shaking itself. Besides, a fleece of this kind is much more warm and light. For these reasons, it is supposed, that no breed of sheep in this island is capable of subsisting on so small a proportion of food as this sort.

It is also said, that this animal appears to be much more patient of hunger, and to keep itself in better condition on a less quantity of food than any other which has been noticed. To the great scantiness of the pastures on which it is usually condemned to feed, is to be attributed the fineness of its fleece; for the quality of this becomes immediately impaired by a copious supply of food; and this circumstance should be attended to in every county where these sheep are introduced.

Some attention has lately been paid to its improvement; and, although the wool be somewhat less fine in its quality than it formerly was, it is still the finest in the island, with the exception of the Spanish sort recently imported, which is not a native breed; and the animal must be allowed, on the whole, to have been considerably benefited. The quantity of wool afforded by the improved sort of Ryeland sheep, although increased, is still far from large, a three years' old wether rarely yielding more than three pounds and a half. But as a large number of sheep will subsist on a small portion of ground, and the wool being valuable, its worth, compared with the quantity of food consumed by the animals, is probably much greater than that afforded by any other breed. Add to which, the Ryeland

sheep readily acquires, on very moderate pasture, that degree of fatness which renders its flesh most acceptable, but it is wholly incapable of being loaded with fat in the manner of the Leicestershire sort. It appears to fatten somewhat more quickly than those of the South-down breed.

It has been suggested, that a cross between the Ryeland and real Spanish, seems the most probable mode of adding to the fineness and value of the wool; and that Colonel Scudamore of Kent-Church, one of those spirited breeders who made the experiment, sold the fleeces of a flock so crossed at forty shillings the stone. The first stage of the cross materially detracts from the beauty of the Ryeland's form, but by continued attention, this objection may probably be removed, and the flavour of the mutton is uninjured. Lord Somerville found that they fed quickly and weighed heavily, although their form was not attractive; but, perhaps, the form in this animal is of little comparative consequence. Neat cattle rarely fatten well, or have flesh of good quality, unless they be of a particular shape; but sheep fatten well, and the meat is of prime quality in those of very different forms. Two Leicesters which were fed by Mr. Hewer of Abergavenny, weighed no less than 51 pounds in each fore quarter, and 45 in each hind quarter: but notwithstanding this great weight, the Leicesters are often found less heavy than they appear to be, whilst the half Spanish weighs more than is generally expected from its size.

In some parts of Devonshire, a cross of the Merinos on the Ryeland breed has been tried with an appearance of success. The three years old wethers of this cross, when fattened to their frame, being, it is said, estimated to near from fourteen to sixteen pounds the quarter, and shear from six pounds and a half to seven pounds of wool in the yolk to the fleece. The sheep, however, are greatly exposed to the foot rot. The cross between the Ryeland and the Spanish has been made in some other parts, which has completely succeeded as to fleece, as the produce of the third cross of this breed sells readily at the highest prices: it is, however, objected to by many on account of its not affording an equal proportion of mutton with the native sheep.

There is a kind of sheep which has also been produced by crossing this breed with the Dishley, in which both the wool and carcass are increased in weight, but much injured in respect to fineness; and it is contended by some graziers, that the breed is thereby rendered much less hardy and useful.

AT THREE YEARS OLD.

Weight *per* quarter, in the true sort, from 10lb. to 18lb., and upwards.

Weight *per* quarter, in the crosses, from 10lb. to 14lb. and 20lb.

Mutton in perfection, at three years old.

——— quality of, excellent.

——— time of using it, in the latter end and beginning months of the year.

In this breed the value of the mutton and wool is of much consideration, as being of the best kinds, and produced on the very inferior sorts of keep. The crossing of them with fine-woolled sheep, however it may have been advantageous in rendering the wool better and larger in quantity, has been somewhat hurtful to the quality of the breed in other respects, as that of form and carcass. And the unnaturally crossing them with the Dishley sort can hardly be doubted to have been highly injurious to them in many of their valuable properties as an original breed, the wool and mutton being thereby greatly altered and deteriorated, as the mixing of long and short-woolled sheep is a

practice which seems improper, and to be wholly at variance with every sound principle of useful improvement and benefit in such cases.

The true unmixed breed of this sort of sheep is very useful in many situations, where the nature of the keep is of the worst kind; they should, therefore, be improved as much as possible in themselves, by careful continued selection, which would most probably render them a great deal more beneficial as sheep-stock, in all such cases, than they are now by some conceived to be; and, at the same time, be advantageous to both the production of good mutton and fine wool, in much larger proportion than is at present the case, by which there would be a considerably increased profit in the sheep.

SHROPSHIRE, OR MORF, BREED, VARIETY, OR SORT.

This sort has small horns, with speckled, dark, or black, faces and legs; they have the full character of real fine-woolled sheep, and have been, for centuries, bred in Shropshire, Staffordshire, Worcestershire, and their vicinities.

Their fleece is nearly all fine, and is considered superior to Ryeland wool, since the crossing which has taken place in that stock. Mr. Pitt, of Penderford, in a letter to Lord Somerville, dated 1799, estimated the extent of Morf Common, or waste, on which they feed, at 3,600 acres, and the number of sheep summered thereon at 15,800, to the annual profit of fifteen shillings the acre in wool only, on a moderate calculation, eight fleeces and a half to the stone of fourteen pounds. Nothing is reckoned on account of carcass, as the sheep have some extra keep during winter. It is added, that some other Shropshire commons produce good fine wool, but none equal to Morf by sixpence a pound.

AT TWO AND THREE YEARS OLD.

Weight, *per* quarter, in wethers, from 12lb. to 18lb. or more.
——— *per* quarter, in ewes, from 10lb. to 14lb. or more.
Mutton, in perfection, at three years old.
——— quality of, very good.
——— time of using it, in the latter part of the year, &c.

This is a good and useful fine short-woolled breed of sheep, that might, in all probability, be still greatly bettered for the purpose of the close, short-grassed, heathy uplands, in many places, by properly selecting them at first, and continuing the best of the produce that was afterwards gained; as by these means much more weight of both wool and mutton would be the consequence, while at the same time the sheep would retain their native hardiness, and fitness for such sorts of exposed hilly pasture lands, and be of the utmost utility and value as to the profits which they would afford. It is, in most cases of this sort, of far greater use and advantage to render the breed better in itself, than to cross it with other kinds, as in that way it is kept in the most proper state for producing the desired effects, in the most full and complete manner, without the danger of injury to any of its more useful properties or qualities.

DORSETSHIRE BREED, VARIETY, OR SORT.

This breed is distinguished by having the face, nose, and legs, white; head rather long, but broad, and the forehead woolly, as in the Spanish and Ryeland sorts; the horns round and bold, middle-sized, and standing from the head; the shoulders broad at top, but lower than the hinder quarters; the back tolerably straight; carcass deep, and loins broad; legs not long, nor very fine in the bone. Weight of the quarter in wethers, at three years and a half old, pretty considerable. It is asserted by Mr. Billingsley, that the wool is fine and short.

This breed has the peculiar property of producing lambs at any period of the season, even so early as September and October, so as to suit the purposes of the lamb-suckler. It has been found to answer well in some of the midland districts; and, from its close make, to be equally advantageous with almost any other. It is, however, supposed capable of improvement, by being crossed with rams of a larger size. There are varieties of it met with in several districts; and it is said, that the Dorset breeders pay great attention to preserve the colour of their flocks from mixture, since white lambs are the most esteemed in the London markets, from a presumed superior delicacy in the meat.

This is believed by some to be one of the best breeds in the country, if not superior to all others, considering its various qualifications and uses. Their property of bringing twins, and making our highest priced house lamb, must be considered first; they are both good hill and pasture sheep, and their flesh is an excellent medium between the delicate mutton of the hills, and the rich and juicy meat of the best lowland sheep. The later Dorset lambs, when fattened, make the earlier grass-lamb. By the practice of this county, the lambs which the breeders retain are shorn at midsummer, having been taken from the ewes in May; produce of wool, one pound to a pound and a half each; the price a penny the pound, nearly, under the price of sheep's wool. A three-shear sheep may produce four or five pounds of middling fine wool, which it would be highly advantageous to improve to the utmost, on this excellent breed.

This sort of sheep seems to prevail in the high lands, and some other parts of the county of Devon, which border on the above, in which they are found to answer very well.

There is a breed nearly connected with this sort of sheep in the Mendip hilly district; they are smaller than that breed, having smaller horns, are more deer-headed, their wool is less in weight, but the mutton excellent in flavour. In the West Riding of Yorkshire, and in the adjoining parts of Westmoreland, they have a breed of horned and white-faced sheep, bearing a strong affinity to the Dorsets; they are called *Craven* and *Winsley-dale* sheep, but more generally *Peniston*, from the market-town where they are sold. They are a good down or hill sheep, in their pure state, and give a fleece of coarse short wool, weighing between two and three pounds; the carcass good; the mutton in the quarter not very large.

They are variously crossed in that Riding, too, with Cheviot, Dishley, and Northumberland tups; with the two last, for the purpose of making pasture sheep, in which case the weight of carcass is much increased. In the north this breed is commonly crossed with the heath sheep, which cross gives them black or gray faces and legs, with sometimes a black spot on the top of the neck; the wool coarse and open, instead of being close and thick-set upon the skin, as a defence against the severity of the climate of that hilly and exposed country in which they are fed; defects for which the remedy is obvious. Ryeland tups have been tried with the Peniston ewes, a cross which made a considerable improvement.

This upland and pasture breed of sheep is very valuable, not only for the goodness of the mutton and wool, but on account of their early produce of lambs, so as to have them for being fed and fattened in the house at almost any season. In this particular quality the breed is probably unrivalled, which renders the sheep very high in value, as their produce often gives more profit, while quite young, than the average increase of the carcass does in most other breeds, at two or more years old.

The breed is perhaps still capable of farther increase in value for such upland pasture keep, by attention in selecting the best of the kind, and continuing the breed from them, without crossing, as in such a mode of proceeding there will be not only an increase of their natural good properties of every kind, but they will be better suited to the circumstances of their pasture; and will produce more weight of better wool and mutton from the same quantity of keep, thus yielding an additional profit of no small consequence.

The crossing or mixing them with larger sorts of sheep, is not so certain a means of bettering them, in other necessary points, as the above method, while it is attended with considerable risk of producing injury in other respects. They are a breed of sheep which are so excellent in themselves, that it would appear highly improper and greatly disadvantageous, to render them less pure by crossing, or mixing them with other sorts, and especially the less long-woolled breeds of different kinds.

AT TWO TO THREE YEARS OLD, IN WETHERS,

Weight *per* quarter, in true sort, from 16 to 20lb. and upwards.

Weight *per* quarter, in Craven mixed sort, from 14lb. to 16lb.

Weight *per* quarter, in Dishley and Northumberland mixed sort, from 20 to 30lb., and more.

Mutton, in perfection, mostly at two years old.

——— quality of, very good.

——— time of using it, the decline of summer, and through the autumn, &c.

SOUTH-DOWN VARIETY, BREED, OR SORT.

This valuable breed is described as having no horns, but gray faces and legs; fine bones; long small necks; and as being rather low before, high on the shoulder, and light in the fore quarter; sides good; loin tolerably broad; back-bone rather high; thigh full; twist good; mutton fine in grain and well flavoured; wool short, very close and fine; in length of staple, from two to three inches: weight of the quarter, in wethers at two years old, 18lbs.

This breed prevails on the dry chalky downs in Sussex, as well as on the hills of Surrey and Kent; and has lately been much improved both in carcass and wool, being much enlarged forward, carrying a good fore-flank; and for the short, less fertile, hilly pastures is an excellent sort, as feeding close. The sheep are hardy, and disposed to fatten quickly; and where the ewes are full kept, they frequently produce twin lambs, nearly in the proportion of one-third of the whole, which are, when dropped, well woolled. The wethers are capable of being disposed of at an early age, being seldom kept longer than two years old, and often fed at eighteen months, which is a very valuable property. But it is stated that the ewes are commonly kept till between four and five, and found to answer well to the graziers in the neighbourhood, as well as the farmers in Norfolk, and the adjoining counties, in the place of home-bred sheep, as being more expeditious feeders and equally adapted for the purpose of the fold. It is in fact a breed of sheep, which, from the compactness of their form, and their legs being shorter, considerably outweigh both the Dorset and Norfolk breeds in proportion to the size of the carcass, being heavy in a small compass. Their hardiness is estimated according to the darkness of the colour in the face and legs; but as there is inconvenience in the produce on this account, from the wool, especially about the head and neck, becoming spotted with black, and thereby thrown aside by the stapler as only of half the full value, a middle degree of colour may be the best. As an open country breed, they are sufficiently gentle and tractable. They are capable of travelling well and of resisting the effects of

exposure to cold. The wool is scarcely, if at all, inferior in fineness to that of the Herefordshire, as the practice of sorting, which is common in that district, is not in use on the downs.

The excellent properties of this breed have been brought fully to the notice of the flock farmer by the great patrons of improvement in Bedfordshire and Norfolk, and its superior merits on trial have been such as to have induced the sheep farmers in various districts to introduce them in preference to other breeds. They consume less food, in proportion to weight, than the Norfolks, yet keeping themselves in better order. Young sheep produce the best lambs; the crosses are of course sold at four or five years old, and if they were sold earlier, it is supposed it would be more profitable to the store-master.

The most noted variety is that of Mr. Ellman, of Glynd, in Sussex, who is supposed to have first enlarged the down breed by the aid of polled or natt Berkshire tups. From this enlarged cross, it is understood, originated the stocks of the Duke of Bedford and Mr. Coke; the South Downs of Mr. Coke being generally acknowledged the largest and finest in the county, a very full proof of which was given in a two-shear Holkham South Down wether, which weighed more than 40lbs. the quarter. Although quick and early feeders, they tallow within remarkably; and it may be said, in answer to the complaints of those who knew the old Down sheep, that their wool is become so much coarser than formerly, from the modern habit of feeding the sheep with rape, cabbage, and oil cake, that they seem totally to forget the middle and long-woolled cross, by which the carcass of the South Downs of the present day has been enlarged, and their weight of wool increased and rendered more coarse. The mutton is still excellent, although probably not so high flavoured as the old Down mutton. It is also further suggested that it would be difficult to point out any part of the island for which this breed would be unfit, but extremely easy to name a vast number of districts where it would be a most advantageous substitute for the native stocks. It is supposed that all which the South Downs want is the noble covering of a Spanish fleece, and how little their carcass would suffer by the cross, has, it is said, been demonstrated by Lord Somerville, in the exhibition of a very fine ewe, large enough for any purpose, half Spanish and half South Down.

AT ONE AND A HALF TO TWO YEARS OLD.

Weight *per* quarter, in wethers of improved sort, from 18lbs. to 25lbs., and more.

Weight *per* quarter, in ewes, from 16lbs. to 18lbs. and 20lbs.

Weight *per* quarter, in Cannock-heath sort crossed, from 18lbs. to 25lbs.

Mutton in perfection at a year and a half old.
——— quality of, very good.
——— time of using, from Christmas to the Spring.

Mr. Overman, of Norfolk, on March 27, 1799, in order to form a comparison between the South Downs and Norfolks, took from turnips twenty-four two-years old Norfolk wethers and ten South Downs of the same age, which had always lived together from the time they were lambed; and two hours afterwards their weight was as follows:

	St.	*lbs.*	*St.*	*lbs.*	*oz.*
24 Norfolks from the field, . .	264	7½			
Average, ...			11	1	15
Ditto, after fasting 28 hours, .	237	13			
Average, ...			10	10	7
Difference, ...			0	5	8

	St.	*lbs.*	*St.*	*lbs.*	*oz.*
10 South-downs from the field,	109	4			
Average, ...			10	13	0
Ditto, after fasting 28 hours, .	106	2			
Average, ...			10	8	9
Difference, . . .			0	4	7

One of each slaughtered.

NORFOLK.

	St.	lbs.		d.	L.	s.	d.
Mutton,	6	10	at	6	2	7	0
Tallow,	1	2½	at	5	0	6	10½
Head and Pluck,	0	10½			0	0	9
Skin,	0	9¾			0	1	0
Wool,	0	3¾	at	17	0	5	4
					3	0	11½
Blood,	0	6¼					
Entrails,	0	11					
Loss,	0	0¾					
Live Weight,	10	12¼					

SOUTH DOWN.

	St.	lbs.		d.	L.	s.	d.
Mutton,	6	8½	at	6	2	6	3
Tallow,	0	13¼	at	5	0	5	7½
Head and Pluck,	0	10			0	0	9
Skin,	0	10			0	1	0
Wool,	0	7½	at	18	0	11	3
					3	4	10½
Blood,	0	7					
Entrails,	0	11					
Loss,	0	0½					
Live Weight,	10	12					
Norfolk,					3	0	11½
Down superior by					0	3	11

It may be considered that these Norfolk sheep, losing 11lbs. 10 oz. more of their respective weight when taken full than empty, is a strong circumstance against them. But besides this, the Downs are run much thicker on the land than the Norfolks. Mr. Hill, of the same district, estimates the difference of stocking between Norfolks and South Downs at one-third in favour of the latter, in number, in better condition, and of greater weight, both in wool and carcass: all fairly attributable to the superiority of the breed, and free from any charge of lessening cattle, &c. When his stock was of Norfolks, scarcely one in a score had a whole fleece, but now they are South Downs, scarcely one in a score is broken. Also Mr. Blythe, of Burnham, had a stock of between five and six hundred Norfolks; he has now a thousand South Downs on the same land, and has likewise double the wool from his land, stocked with South Downs, compared with what he clipped when under Norfolks. Again, Mr. Dursgate, who has had South Downs for some years, is clear that, free from all change in husbandry or other circumstances that would unfairly affect the comparison, the number kept, compared with the Norfolks, has been as five to four. The carcass is as heavy as the Norfolks, more wool, and at a better price. He does not fold, but the South Downs would bear it better than the Norfolks. At Palsgrave, he folds the South Downs, because there is a sheep-walk: a Norfolk flock thus changing gradually to South Downs, is much in favour of the latter.

The South Downs are considered by many to be much superior to the Norfolk, Cambridgeshire, and west country sheep, in point of form, hardiness, fineness of wool, and disposition to fatten. Crosses of the South Down with other sorts are likewise much approved of in several places; as that of the South Down ram with the Norfolk ewe, the lambs of which cross are greatly admired. Some graziers suppose the cross equally beneficial with several other breeds, according to the circumstances of the different districts; but this sort of crossing is very sparingly practised in the native district of this breed. It has been tried with Spanish rams, and the wool has been considerably improved by the attempt; but two great defects, not to be compensated by any improvement in the wool, have in some instances been produced; namely, tenderness of constitution and badness of shape. In other places, however, these defects have not appeared. In Oxfordshire, and several other counties, the South Down breed is rapidly supplanting the Berkshire, Norfolk, and many other sorts.

It is stated in the Staffordshire Survey, that

the Cannock Heath is a sort of sheep that has much resemblance to this breed, and is believed to have originated from it. It is further noticed, also, that the breed has been much improved in the form, thickness, and weight of the carcass, as well as the fineness of the wool, by crossing with rams of the Herefordshire breed.

These Heath sheep are polled with gray faces and legs, low before; wool fine and thickly set, weighing two or three pounds the fleece; the mutton good; and the weight from fifteen to twenty pounds the quarter. In Sir Edward Littleton's improvement of this breed by crossing with Herefordshire tups, the carcass and wool were both bettered.

This excellent hardy down, hill, and upland short-grassed pasture breed of sheep may probably be rendered still more perfect, both in their carcass and wool, by paying more attention to the breed in its true state, without any mixture of other sorts; namely, by providing the best sheep in wool and carcass, and proceeding in the same manner carefully with the produce of them afterwards; by which means the carcass would be gradually enlarged and bettered, the wool would approach nearer in fineness to that of the best Spanish sort, and would be grown more evenly fine over the whole body, without the intermixture of dark-coloured hairs, which are apt to prevail in some parts. In this manner, the defects in the fleeces of this sort of sheep, and which are also common to most other breeds of the fine-woolled kinds, except the Herefords, might probably be corrected without any injury being done to the nature or form of the sheep, or lessening the weight of the fleece. If, however, it were found, on full trial, to be too tedious and troublesome to effect these improvements in this way, they might perhaps be more readily and completely accomplished by having well formed superior rams of the mixed Down and Spanish sort provided; from the produce of which the best and most perfect in every respect might be kept in succession for the purpose. If, however, too much of the Spanish cast should appear in them, a further cross of the perfect Down sort would afford a progeny from which a breed might be drawn that would have all the good and desirable points and qualities of carcass, with the wool greatly bettered in fineness and considerably increased in weight.

How far this most useful and valuable kind of sheep may have been altered for the better, by crossing in other methods than those that have been noticed, is not well decided upon; but it seems that the more the native sort, or those that come the nearest to it, can be preserved or united, the more the breed will be benefited in all such attempts and trials.

By this method of improving this breed, there would be a considerable increase of good mutton and fine wool from the same quantity of keep, which would give a more enlarged profit, and the sheep would become more perfectly suited to the nature of the pastures which they usually occupy; whereas by the use of other large mixed breeds that are not congenial, there would be a necessity for food of much richer kinds, which would probably have a prejudicial effect in several other respects upon the progeny of such a cross.

This breed, in its improved state, will probably be found to be more profitable and valuable in almost every situation, except those of the high mountain kind, than any of the other native fine-woolled breeds.

NORFOLK BREED, VARIETY, OR SORT.

The faces of this breed are described black; the horns large, and spiral; the carcass long,

small, weak, and thin; narrow chine; large bones; very long black or gray legs; mutton fine grained and high flavoured; the weight in the quarter moderately large; the wool in the best parts short and fine, but part coarse. This breed is chiefly prevalent in Norfolk and Suffolk, where folding is much the practice, as they have the property of travelling well. They are restless in disposition, which renders them an unfit stock, except in good enclosures.

This sort of sheep, possessing few valuable properties in addition to that of standing the fold well, and requiring much expense in winter keep, an acre of turnips besides hay being the usual allowance for half a dozen sheep, has lately given place to the South Downs, which are supposed to be hardier, less nice in their food, sooner ready for the fold, and more quiet in disposition. This last sort has lately gained much ground. The wool of the Norfolks might be improved by a Spanish cross, but little other advantage would be gained.

In respect to the quick *tainting* of the mutton in this breed, Mr. Vyse, butcher of Eton College, has long since remarked, that the Norfolk mutton certainly will taint much sooner than any other in very hot weather; neither is there any sort, that he knows, of a worse flavour at that time, though inferior to none in cool weather. Many very fine and fat Norfolks do not please on the table. The fat runs away in roasting if they are put before a hot fire, and they rarely are so sweet as the South Downs: the latter are in hot weather worth a halfpenny a pound more than the Norfolks. When both are *completely* fatted, it is hard to say, supposing the season cool, which upon an average is fattest: the flavour, too, in such a season he thinks, is equal; and as to coarse meat there is none in either sort. But if they are killed in cool weather, before they are very fat, the preference must be given to the Norfolks because the meat will in that case eat better, and there is a probability of much more fat within. With respect to the profit of the feeder, if they are fed entirely upon good grass land, his opinion is decidedly in favour of the South Downs; or if they eat turnips in the winter, and after that are kept two or three months upon grass in the spring, it is the same; but if they are half fat against winter and are to be completed at turnips, he believes no sheep are more profitable than Norfolks, perhaps none so much so. But both sorts should be kept when there are both turnip and grass land.

There are varieties of this breed in Cambridgeshire and Suffolk, with coarse wool, and weighing somewhat heavier in the quarter.

Crosses of the Norfolk with the South Down, and many breeds of other kinds are also met with, and highly valued in different situations.

Various opinions prevail with respect to the superiority of the Norfolk and South Down; however, by an experiment made by an experienced farmer at Finchfield in Essex, who purchased a lot of ewe lambs of both sorts, which were pastured together, and received in every respect the same treatment, a single sheep, which was adjudged to be the level of each lot, having been taken out, after they both had fasted twenty-six hours; they were weighed alive, the South Down weighing ninety-six pounds, and the Norfolk ninety-five pounds: they were then killed, and the difference in favour of the Norfolk sheep was five shillings and eightpence. It should be observed, that neither of these ewes had any lambs; but at the time of trial, the Norfolk was more than half way gone with lamb, and the South Down had but just taken the ram.

Indeed, the leading qualities of the high and full-bred Norfolk and South Down sheep, seem upon comparison to be chiefly these: the wool of both is found to be of the first clothing quality, but the larger quantity is produced by the South Down: the mutton of both is equally delicious. However, the tame and gentle South Down in the pastures, must be opposed to the wild impatient ramblings of the Norfolk, whose constant exercise not only excites continual appetite, but at the same time occasions considerable waste in the pastures, by treading down, and unnecessarily spoiling, a great deal of food.

The hardiness of the South Down, enduring wet and cold lodging, and a greater degree of abstinence and fatigue than the Norfolk in the fold, is a superiority too of much moment; and only to be equalled by another which they possess in a very superior degree, which is that of doing well upon coarse sour pastures. These are fairly to be contrasted with the delicate constitution and the tender aromatic herbage required by the Norfolk; add to which, that the South Down is an equally good turnip sheep; and for every possible purpose, whether for its flesh, for its wool, for breeding, for folding, or for the butcher, they demand a less supply of food, and of an inferior quality to that which, in every situation, would appear indispensable to the well-doing of the Norfolk. On the score of the first cost of these sheep, an objection may, it is said, be very justly stated as to their general use; but when the South Down are more generally bred and increased through the country, in that proportion will the present objection be done away with; and although they may continue in equal estimation, they will, nevertheless, by their being more generally diffused and increased through the country, in that proportion, cause the present inconvenience to be removed; and though they may continue in the same demand, they will, by their being more generally diffused and increased every where, be brought to a more equal level, in point of price, with the Norfolk, Welsh, and all those breeds so justly held in requisition for the fineness of their wool, and the superior excellence of the flavour of their mutton.

The value of the crosses which have been made between the Norfolk and Welsh sheep, by the South Down rams, is far from being decided, some sheep farmers thinking them highly beneficial, while others strongly reprobate them.

AT TWO TO THREE YEARS OLD.

Weight *per* quarter, in wethers, from 18lbs. to 25lbs. and upwards.

Weight *per* quarter, in ewes, from 16lbs. to 18lbs. or more.

Weight *per* quarter, in the mixed sorts, from 19lbs. to 20lbs. and 26lbs.

Mutton in perfection at two and three years old.

——— quality, of, pretty good in season.

——— time of using, in February and March.

In their particular district, many flocks of this sort of sheep have lately been changed from the full conviction of experience, that they are a very disadvantageous sort of stock; and other better kinds have been introduced, capable of standing the fold if necessary, equally well, and which pay far better for their keep. When sheep of this sort and the above-mentioned Down kind, that had been kept together from the time of being dropped as lambs, came to be disposed of at the age of two years, the latter gave seven shillings a head more than the former. They are, also, more weighty in the fleece by nearly a pound, and are considered to be more hardy, less nice in feeding, far less wild, and much sooner ready for the fold, in which they can be much more easily confined. The prejudices of many graziers

South Down & Norfolk Breeds.



Improved Down.



Norfolk.

London, Published by Thos. Kelly, *17, Paternoster Row, June 1, 1822.*

have lately indeed given way in favour of them, which is a strong proof of their superior utility and benefit.

From the quantity of turnips and hay, which is consumed in the winter keep of the ewe stock of the Norfolk sort, namely, an acre of the former for every half dozen sheep, which, with the hay, rye, and other such crops, together with the pasturage on the heathy and fuzzy walks which they occupy, a very great expense is incurred, as by estimating the value of the roots only at three pounds the acre, and the supply of hay and other food at two shillings, which prices are much too low, the amount of winter keep would be twelve shillings for each sheep, which is a very heavy charge.

In the first flocks of this kind, the yearly produce in lamb, wool, and the fold, has been stated to be about thirteen shillings the head, but for the whole district probably not more than ten shillings, which falls short of the expense of their winter keep, which is probably much higher than any other breed in the country requires. On this breed of sheep little further alteration can probably be made with any great benefit, as they are chiefly useful and valuable for the purposes of the fold, and only answer well where there is plenty of other sorts of food or keep than that of the pasture kind. By crossing them in any manner, little could be gained except an improvement in the fineness of the fleece, while there might be much injury sustained in other ways.

They are useful for their produce in mutton and wool, but that is gained at a very heavy expense of winter keep, and their wild disposition causes them to be an inconvenient sort of sheep stock in many situations. It is, therefore, by no means surprising, that they should be fast giving place to better and more tame sorts of pasture sheep, such as the Down, Dorset, and Dishley kinds, a circumstance which must be greatly beneficial to the district, as it has long stood in need of a better sort of sheep stock than the native breed.

HERDWICK BREED, VARIETY, OR SORT.

The face and legs in this hornless breed are speckled; the larger the portion of white, and the fewer black spots, the purer the breed; legs fine, small, and clean; the lambs well covered when dropped; the weight of the quarter, in the ewes and in the wethers of four years and a half old, small; the wool short, thick, and matted in the fleece. It is a breed peculiar to the elevated mountainous tract of country at the head of the rivers Esk and Duddon in Cumberland, where they are let in herds at an annual sum, whence the name. At present they are said to possess the property of being extremely hardy in constitution, and capable of supporting themselves on the rocky bare mountains, without support of any hay in the winter season, by scratching down to the heath during the snows for their subsistence, and by their constantly moving about, not being liable to be drifted over by snow.

From the nature of the climate, the ewes produce their lambs late, and are generally kept as long as they produce them; but the wether stock are usually disposed of from the mountains, without being put in the pastures at from four to five years old.

The fleece of this breed is said to be finer than that of the heath sort, but coarser than any of the short-woolled breeds. It is a breed that stands in need of a cross with some of the finer-woolled breeds, and the Spanish has been suggested as proper for the purpose.

The property of the flocks as well as of the mountains, is in Lord Muncaster, the lord of

the soil: and the farmer of the principal stock is now Mr. Tyson, whose family, it is said, have inhabited this wild and sequestered spot during four centuries. Mr. Tyson is a tup-breeder, and sells a number of Herdwick tups yearly, some at several guineas each, to the adjoining districts, where their known hardy qualities are highly admired.

AT FOUR YEARS AND A HALF OLD.

Weight *per* quarter, in wethers, from 9lbs. to 12lbs. and 14lbs.
Weight *per* quarter, in ewes, from 7lbs. to 8lbs. and 10lbs.
Mutton in perfection, at four and a half years old.
——— quality of, very good.
——— time of using it, in the autumn and winter months.

There is an activity in these little sheep which renders them extremely well suited to the keep of the exposed bare mountains on which they mostly feed; in many parts of which there is a short grassy and heathy intermixture of plants, that chiefly constitute their food. This breed of sheep, properly improved in the wool, by suitable crossing with the fine short-fleeced sorts, would from their great hardiness, probably be of some use in adapting a few other kinds for similar situations, and sorts of keep; but from their very small size, and the nature of their coat, they could only be useful in this way for the sheep of such exposed hills. The breed should not, however, be suffered to remain in such a coarse neglected state of coat, as it affords an useful and valuable sort of mutton, and as it would not require much trouble to change it to one of more utility and profit.

HEATH BLACK-FACED MOUNTAIN BREED, VARIETY, OR SORT.

This is a breed of sheep which are described as having large spiral horns; black faces and legs; a fierce wild look in the eyes; short firm carcasses; weight of the quarter not very great; skins covered with long, open, coarse, shagged wool; fleeces three or four pounds each. They are an active hardy sort, running with amazing agility, and have been said to be best adapted, of all other breeds, to exposed, heathy, and mountainous districts: seldom fed until three, four, or five years old, when they feed well, and make the finest mutton, having a high-flavoured gravy.

This wild-looking breed are natives of the north-west part of Yorkshire, and of the mountainous tract of country adjoining the Irish sea, from Lancashire to Fort William; they have been of late years introduced into the western Highlands of Scotland.

Some sheep-farmers suppose, that the black-faced Linton, or short sheep of Scotland, are a variety of the heath sheep. They have been crossed with the Cheviot breed, and a Dishley cross has been advised, doubtless, for the use of the Lowlands. But for upland situations, a Spanish cross, with good winter keep, is recommended in preference to all others. It is considered disgraceful to the rural improvement of the country, that so excellent a breed of sheep should be needlessly compelled to brave the rigour of the seasons in such loose, ragged, and poor clothing, when they might, with a few years' pains, and without any deterioration of the carcasses, produce a fleece of high value and consequence to the manufactures of the nation. A salesman of Newgate-market and an eminent grazier fed a lot of these northern heath sheep, and made excellent mutton of them, which weighed about sixteen pounds the quarter; but their wool, which hung down their quarters like goat's hair, was so very bad, that it could be sold only for mop-yarn.

What are termed *black-faced* or *short sheep*, have been originally short-woolled, the present

length of it having proceeded from crossing; and it is not well ascertained whether they are a native Scotch breed, or whether they have been introduced from the Moorlands of Yorkshire. Besides the objection to these black-faced sheep, on the ground of the coarse, loose nature of their wool, they are subject to the *braxy*, a disease that was unknown in the Highlands before their introduction.

It has been remarked, that the kind of sheep bred, and most generally kept in the Lammermuir tract, is the black-faced, or more properly the *brocked-faced*, a sort of dirty-looking mixture of black and white; they are in general horned: when they are fed, the wethers there weigh from ten to twelve pounds the quarter, and the ewes from eight to ten on an average. It will take eight or nine fleeces of the ewes and hogs, and six or seven of the wethers to make a stone of seventeen pounds, of twenty-one ounces to the pound; the quality, and consequently the price, vary much. The difference of quality may result from various circumstances: it is owing partly to the quantity of tar put upon the sheep in salving; partly, it is supposed, to the situation in which they pasture, as those fed on high grounds and coarse mossy herbage, are thought to have inferior wool, and partly to the general attention and care which farmers bestow upon their flocks, in which some are greatly superior to others.

It is supposed, that the black-faced sheep are capable of very considerable improvement; as it does not appear that much has been done for bettering the breed, which certainly places them in an unfavourable situation, when their merits come to be discussed in opposition to others which have received great attention. There can hardly be a doubt, that the weight of the carcass and the quantity and quality of the wool might be increased by sufficient care in the selecting the shortest, healthiest, and best feeding amongst them, for the purpose of breeding. It has been noticed, that those which feed best, have the greatest quantity of wool, and generally of the best quality; and it is natural to suppose that it should be the case, as they must be the healthiest and strongest.

AT THREE AND FOUR YEARS OLD.

Weight, *per* quarter, in wethers, from 10lb. to 12lb. and upwards.

Weight, *per* quarter, in ewes, from 8lb. to 10lb.

Weight, *per* quarter, in the Linton and Lammermuir sorts, the same.

Mutton, in perfection, at three to four years old.

——— quantity of, very good.

——— time of using, the latter end of the year.

This hardy fine-muttoned breed of sheep seems to stand much in need of having the form improved, and the wool rendered of a much more fine quality, as well as to acquire a disposition to fatten in a more ready and quick manner, in order to attain their greatest use and value as a mountain breed, for which, in such exposed situations, they would then be far better suited, and much more profitable in every respect; and which might in all probability be done to some extent without any mixture of other sorts by proper selection, and attention to the hardiness of them, which is a very material point in such circumstances. There would then be an increased quantity of meat more quickly produced, with an improved sort of wool, which would of course render the sheep of a much greater value than they are in their present state of carcass and fleece.

CHEVIOT BREED, VARIETY, OR SORT.

This variety of sheep is known by the want of horns; by the face and legs being mostly white, and the eyes lively and prominent; the body long; little depth in the breast, being narrow there, and on the chine; clean, fine,

small-boned legs and thin pelts; the weight of the quarter, when fat, not heavy; the wool partly fine and partly coarse.

This is considered by some graziers as a valuable breed of mountain sheep, where the herbage is chiefly of the natural grass kind, which is the case in the situations in which they are most prevalent, and from which they have obtained their name. This breed has undergone much improvement within these few years in respect to its form and other qualities; it has been lately introduced into the most northern districts; and from its hardiness, its affording a portion of fine wool, and being quick in fattening, it is likely to answer well in such situations. The Spanish and South Down have been recommended as proper crosses for the Cheviot sheep.

It has been observed, that the Cheviot sheep are in every respect superior to the black-faced kind, and are found to be equally fit for a mountainous situation. They are hardy, fine-woolled, and well shaped. They are long-bodied and long-limbed, which fits them for climbing steep mountains, and for travelling, either for seeking their food, or for being driven to a distant market. Their fleece is finer, closer, and warmer. They have every property that should be sought in a mountain sheep, and accordingly they have been found to thrive in every part of the Highlands in which they have been tried, and are less subject to diseases than the black-faced kind. Some of them have been lately introduced into the highest parts of Glenurchay, and found to answer exceedingly well. A few years ago, a trial was made of some Cheviot wedders in the same tract of country, in order to see how they would fare on the same pasture with the black-faced kind; and it is said, by some of the store-masters, that they perceived no difference in their thriving. Indeed, no part of this county is more inclement than that from which they came, where the hills are sometimes covered with snow for three or four months in the year, and where many of the lower walks consist of peat bogs and deep morasses; so that in almost any parts their situation would be mended, a circumstance which will always ensure success.

An experiment, made in the parish of Barr, in Ayrshire, shows the comparative hardiness and value of the Cheviot breed. In June, 1792, a ram and two score of ewe hogs of this breed were put upon one of the highest and coldest farms in the parish. The harvest was wet, the winter and spring stormy, and the loss of the native sheep, through poverty and disease, was considerable. Yet all these, though strangers, and in such a situation, did well. The wool of the native sheep, taking ten fleeces to the stone of twenty-four pounds, selling at seven shillings and sixpence, and that of the Cheviot kind, taking only seven and a half to the stone, selling at fifteen shillings, is very material. The profit here is great; but how much more if the wool had fetched its real value of twenty shillings the stone!

It is stated, that "in 1792, the Cheviot wool sold from eighteen to twenty shillings the smeared, and from twenty to twenty-two shillings the white; from six to eight fleeces of the first, and from eight to nine of the last, going to the stone. Some fetched as much as twenty-three shillings, and it is thought it will soon be improved so as to fetch thirty if not forty shillings. Draft ewes sold from twelve to sixteen shillings, and three years old wedders from eighteen to twenty-two shillings. In Etterick, Ewesdale, and Liddesdale, they are now converting their flocks as quickly as possible into the Cheviot breed."

It is asserted that "Liddesdale is the worst district, yet the Cheviot breed thrive in it.

It is also remarked, that though it is difficult for those who have got another kind to change the breed, yet new beginners ought, undoubtedly, to stock with the Cheviot kind. But it is noticed, that the Yorkshire graziers have a prejudice against this kind, probably because they would then have more rivals in the trade, which is now in few hands; as the carcass, and not the wool, is the principal object of attention. Whatever there may be in this, the introduction of the Cheviot, which would treble the price of wool, would more than balance it. It is added, too, that even they who have another sort of stock, and cannot conveniently change it, might at least cross it with the Cheviot breed, which might be effected with little trouble and to great advantage. In the years 1787, 1788, and 1789, an intelligent farmer in the parish of Moffat, put Cheviot rams to the black-faced ewes. In 1790 he sold the wool, produced by that cross, at ten shillings the six fleeces; and the wool of the other stock of the black-faced kind, which went exactly on the same pasture, only at six shillings and threepence the seven fleeces. The sheep thus produced, were as healthy as his other sheep, the carcass not materially altered, and the weight of the wool increased a seventh part, and its price more than a third. The farm on which they were fed, is as high ground as almost any in Scotland.

Those at present known by the title of *Longhill sheep*, by the northern flock-farmers, are a horn-less, white-faced, loose-shaped breed, having a coat of ordinary short or of fine wool, perhaps raised by crossing through time the old country breed with those of the Cheviot kind. They are said to be more tender than the short or black-faced breed, but to answer well with good care and keep.

AT FOUR AND A HALF YEARS OLD.

Weight *per* quarter, in wethers, from 14lbs. to 18lbs. and upwards.

Weight *per* quarter, in ewes, from 12lbs. to 18lbs. or more.

Mutton in perfection, at the above age.

——— quality of, very good.

——— time of [illegible], the later summer and the winter months,

The practice of milking ewes of this breed for the purpose of making cheese, having been found prejudicial, it has been generally relinquished by the best sheep farmers in these districts.

Among the Cheviot sort of sheep, there are some which are speckled on the faces and legs, being perhaps a mixed kind, produced by crossing with the black-faced heath sheep, which are, and long have been, natives of the same vicinity; but which are gradually lost in approaching from the eastward, the extended green hilly border districts that surround the sides of the Cheviot mountains in every direction, to the steril heathy tracts of Lammermuir, which are all covered with this breed of sheep.

This is a very useful and valuable breed of sheep as a mountain kind, where there is much pasture herbage, as is the case in the situations where they are bred and raised, by which they are well supported in the summer, so as to be enabled to stand the exposures of the winter storms and colds.

Though the form of these sheep has been already considerably improved, much yet remains to be done, particularly to the fore-parts, which have much defect in them. But these and other faults, which they may formerly have possessed, seem to have been much amended, and in the progress of time will probably be wholly removed.

In the keeping of these sheep, the several different sorts are put into separate divisions,

and each kept upon that kind of pasture, which is considered the most proper for them, under the care of shepherds, who are obliged to deliver the same number of sheep that were given to them, or to account for them; which are commonly disposed of at different rates in proportion to their goodness. No other sorts of food are ever given to the sheep, than that which their pastures afford, except in the case of great and heavy snows, when they have a little hay.

The ewes are not suffered to breed till the age of three years, and at about four and a half they are usually disposed of for fattening, at about thirteen shillings each, both they and their lambs being made fat in the following summer, giving a profit of from twelve to fifteen shillings for the year's keep on grass. The sale in the wethers commonly takes place at three and a half years old, bringing from fourteen to fifteen shillings each, and which, after being kept nearly twelve months on grass, leave a profit of from ten to twelve shillings each sheep. The improvements which have been gradually taking place in these sheep, have, however, tended much to increase the profits of them; but it may be useful to have the milk drawn from the udders of the ewes several times after the lambs have been weaned, without going on with it for much length of time, as two months or more, which is apt to reduce the ewes too greatly, and render them incapable of standing the winter so well, while the profit of the practice is but small, being not more than about eightpence or tenpence each ewe. The cheese, when well made and sufficiently kept, is, however, very good in many cases.

This is a breed of sheep, which, by still further amendment, will in all probability become so advantageous and so well adapted for mountain exposures, and mountainous sorts of keep, as to render the use of coarse woolled sheep-stock in such situations wholly improper, and unnecessary; which would be a circumstance of very great utility and benefit in every respect. By the form becoming better, the feeding quality more expeditious, and the coat more uniformly and generally fine in all parts, with the native hardiness, an uncommonly beneficial hill sheep would be formed; and the profit both in mutton and wool would be prodigiously increased from the same kind and quantity of keep.

DUN-FACED BREED, VARIETY, OR SORT.

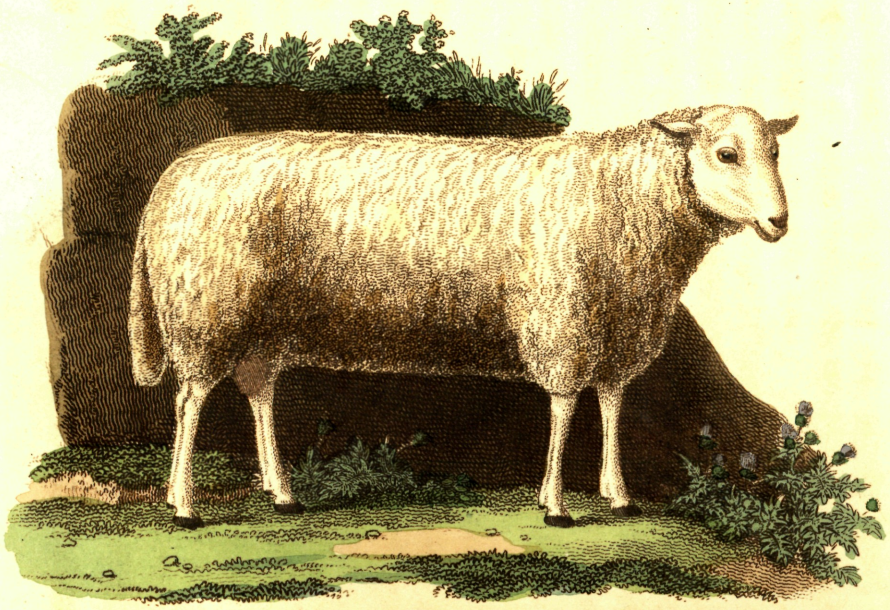
This sort of sheep is described as hornless; the face in common of a dun tawny colour; the size small; the tail short; the mutton fine in texture; the weight often only very small in the quarter; the wool variously streaked or blended with different colours, some of which is very fine. It is supposed, to partake of the Spanish breed, but not to be so hardy as the Cheviot breed. The mutton of this breed is excellent in flavour. They are supposed by some to have a Spanish origin; but they have been naturalized for a long time on the Grampian and other hilly districts in the north of Scotland.

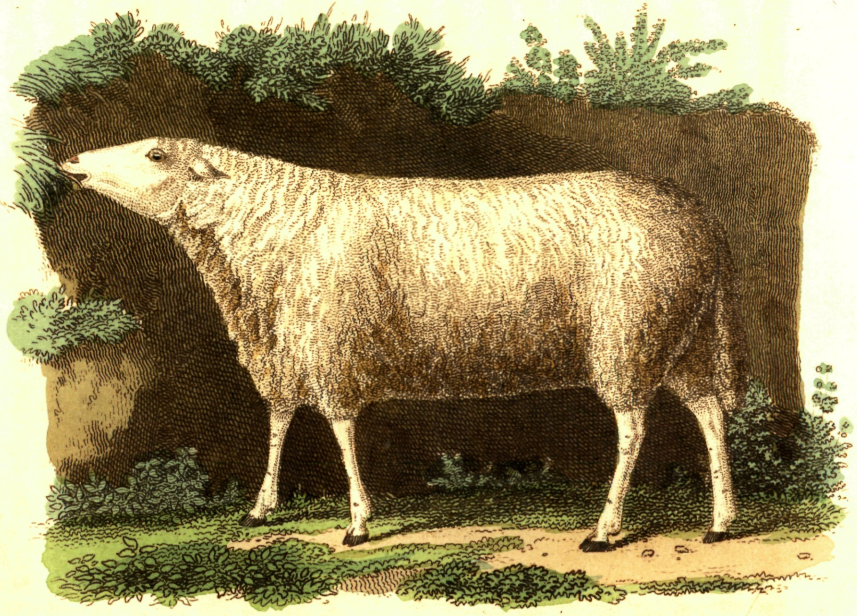
AT FOUR AND A HALF YEARS OLD.

Weight *per* quarter, in wethers, from 8lbs. to 12lbs.
Weight *per* quarter, in ewes, from 7lbs. to 10lbs.
Mutton in perfection, as above.
——— quality of, very good.
——— time of using, the beginning winter months.

It has been suggested, by Mr. Cully, that this fine-woolled breed of sheep may have been descended from, or have arisen by, a cross of Spanish sheep, which were thrown on the coasts, near where they are now found, at the time of the discomfiture of the Spanish Armada. It is

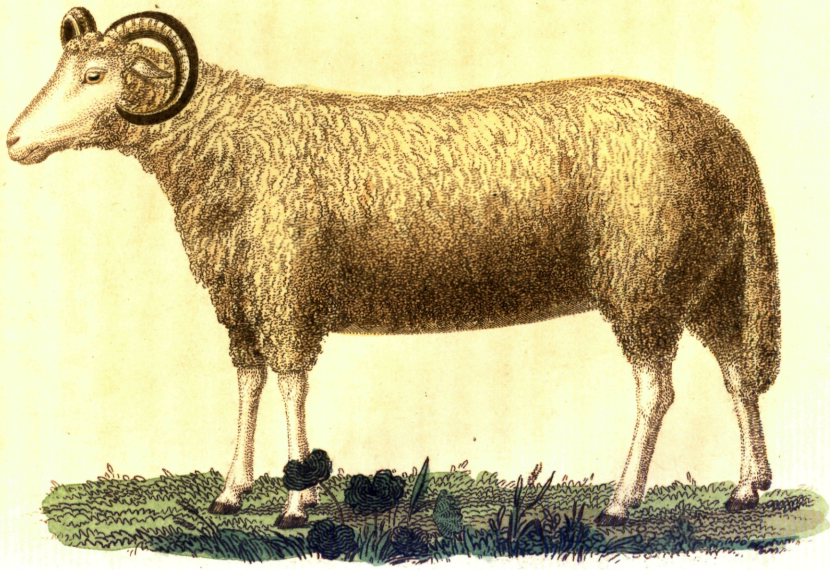
CHEVIOT





DORSET





London, Published by Thos Kelly, *17, Paternoster Row, June 1, 1822.*

certain, that a breed of such sheep has been discovered in Spain, which, from the information that has been received, seems almost to put the matter out of question; as in the province of Andalusia, the very same sort of sheep have been seen by Mr. Stephenson, an ingenious inquirer, and a traveller in that country, and which are there termed *ovejas marinas*, the wool of which forms the fine Segovian cloths, and is considered the finest in the world, with the exception probably of the Vigonian and Cachemerian sorts, of which the finest turbans are fabricated.

It is considered as probable, therefore, that this breed may be too tender and delicate for the mountain tracts, where it is now found, and be liable to be supplanted by those of the more hardy mountain sorts, as the Heath and Cheviot kinds, which are now so much introduced into those situations.

If this breed should become sufficiently hardy for the upland hilly districts where they are found, they may become beneficial in a very great degree, by the fineness of the fleece, and the goodness of the mutton, which, from the nature and smallness of the breed, must be in very general use and demand. For the same reason, too, they are, perhaps, the most proper and fit sort of any for the short scanty kind of keep, on the heights which they constantly inhabit.

SHETLAND BREED, VARIETY OR SORT.

This breed is described as small, and mostly without horns; but what more particularly distinguishes it from other sorts, is the uncommon smallness and shortness of the tail; the weight of the quarter but small; the wool very fine, and of various colours. It is a breed which is very hardy, but much too wild in its disposition to be confined in enclosed pastures, and of course less proper for the purposes of the grazier.

It is asserted, that there is a sort of this breed of sheep which carry coarse wool above, and fine soft wool underneath; and have three different successions of wool annually, two of which resemble long hairs rather than wool, and are by the common people termed *fors* and *scudda*. As soon as the wool begins to loosen at the roots, which is mostly about February, the hair or *scudda* spring up; and when the wool is cautiously pulled off, the tough hairs continue fast, until the new wool grows up about a quarter of an inch in length; then they gradually wear off; and when the new fleece has acquired two months' growth, or thereabouts, the rough hairs, termed *fors*, spring up and keep root until the proper season for pulling it arrives, when it is plucked off along with the wool, and is separated from it at the time of dressing the fleece, by an operation called *forsing*. The *scudda* remains upon the skin, as if it were a thick coat, a protection against the inclemency of the season.

The native or kindly breed, however, that bear the soft cottony fleeces, are rather delicate; though the fact of their eating the seaweed greedily when the ground is covered with snow, and often during long and severe snows, when they have little else to live on, seems to prove the contrary. Nature is supposed to have imparted to them a perfect knowledge of the times at which this food may be procured; for immediately upon the tide beginning to fall, they in one body run directly down to the sea shores, although feeding on hills several miles distant from the sea, where they remain until the tide returns and obliges them to seek their usual haunts. They are very hardy, and the wildest of all the breeds of these animals in this country.

In respect to the wool of these *beaver* sheep, as they are sometimes termed, it is short and open, and destitute of a covering of long hairs. These fine soft fleeces are liable to be rubbed off during winter or early spring, which, it is supposed, might be prevented by clipping the sheep in the usual way, instead of the absurd mode of pulling them off, which tends to weaken the sheep and decrease the length of the staple of the wool. This wool is of various colours: there is the *silver gray*, which is the finest and softest; the pure *white*, which is mostly of the greatest value for all the purposes of the finest combing wool; the *black* and the *mourat* or *brown*, which are very little inferior. The whole is of the softest texture, fit for the finest manufactures, and in some instances even rivalling Spanish wool, than which it is somewhat longer in the staple, and not so elastic. It is said to have been manufactured into stockings of extraordinary fineness, and that the fleece attached to the skin affords a fur of great value.

This breed was formerly a native of the higher parts of Aberdeenshire, and in the districts to the northward of it; but it has been since much crossed, and is now mostly confined to the Orkney and Shetland islands, the purest breed being found in the latter. The number of *beaver* sheep in these isles amounted to 90,000 some years since, and five or six of them are said to be capable of being fed with the food required for one English sheep. It is stated, that in the West Riding of Yorkshire, Mr. Beaumont made a trial of these sheep; the result of which was, that they did not fatten, but grow, which shows that their size would improve with that of the soil; their wool also improved in length.

The original native breed of the Highlands are said to partake of the nature of the deer or goat, their coat consisting of a sort of fur or down, covered by long, straight, rigid hairs, like those of the beaver, rather than wool; tail short, slender, tapering, not larger than that of the deer or goat, and thinly covered with strong silvery hairs; the face covered with sleek hairs, like the face of the deer, with its prominent eyes. They are tame, delicate of frame, and require to be housed in winter; their flesh of high venison flavour. The breed is found in its original purity in the central Highlands, on the southern banks of Strath Tay, and between those and Strath Brand; and on the banks of Loch Ness, in the northern Highlands, as well as in the Shetland islands.

This is a breed of sheep in which the two sorts into which they may be divided somewhat differ as to the nature of the coat; but in hardiness are much the same, having that quality in a very high degree. They are, however, much in want of improvement in disposition, their present wildness and restlessness detracting much from their utility and profitableness.

There is yet too little known of the origin and nature of this peculiar breed of sheep accurately to ascertain the uses for which it may become particularly valuable; but it cannot be doubted that both the wool and the mutton are of a nature to be rendered very valuable and beneficial by proper attention and management. The former, however, blended with a coarse hairy material, possesses that unusual degree of softness which is so suitable for the more rich articles of different kinds of woollen fabrics; and by placing the sheep in proper situations, with suitable management, the wool would most probably soon become free from the coarse hairs with which it is now so intermixed and debased, which would render it of the highest possible value, as being

adapted for the finest uses. With respect to the latter, the fineness of the quality and flavour of the mutton must in all cases make it an article of much use and great value.

It is certainly high time that the present manner of treating this breed of sheep should be wholly changed, as it does not tend to improve them in any respect, while there is the greatest danger of their sustaining much injury by its continuance. The crossing that has hitherto been practised with them, has probably done little or no good in promoting their real utility or value.

It has been surmised that this breed of sheep may probably be descended from the soft-woolled flocks of the Romans, and have been brought by them into this country, where the nature of their insular situation may in some measure have preserved them in their pure state.

AT FOUR AND A HALF YEARS OLD.

Weight *per* quarter, in wethers, from 8lbs. to 12lbs,
Weight *per* quarter, in ewes, from 7lbs. to 10lbs.
Mutton in perfection, as above.
——— Quality of, very good.
——— Time of using, the early autumn and winter months.

MERINO OR SPANISH BREED, VARIETY, OR SORT.

The males of this breed are described as having horns, but the females none; they have white faces and legs; the body not very perfect in shape; the chest narrow; rather long in the legs; fine in the bone; a degree of throatiness or production of loose pendulous skin under the neck, and the pelt fine and clear. Weight, when tolerably fat, of the quarter, in the rams and in the ewes, middling; the wool very fine. This, which is not a native breed, is asserted by some to be tolerably hardy, and to possess a disposition to fatten readily; but others maintain a contrary opinion.

The term Merino, in the Spanish language, is an adjective, derived from the corrupt Latin *merinus* or *majorinus;* and when united with *ovejas*, it signifies the superintendent of the sheep-walk; *merinos* ovejas being the sheep under the care of the merino or mayor.

Dr. Parry, who has had great experience in this breed of sheep, states that they are entirely enveloped in wool, which grows under the jaws, down the forehead to the eyes, under the belly and down the legs to the very feet. It is astonishing to see how thickly it covers the skin; it will scarcely give way to the pressure of the hand, but yields, as it were, by starts, like the close short hair of an extremely fine clothes brush. In washing them, the water penetrates to the skin with great difficulty. The fleece is heavier in proportion to the carcass, than that of any other known breed in Europe. In the raw state, (unwashed on the sheep's back, or afterwards) the fleeces of the two-years old ewes average at 4½lbs. avoirdupois, and the weight of the living ewe being about 60lbs., the proportion of wool to that of carcass is about one to twelve and a half. The fleece of a fat wedder of the same age will be from 5 to 7lbs. In eight shearling rams, weighed alive, after having been clipped, the weight of the fleece to that of the living animal was as one to about twelve and three quarters. The wool from the head and behind the ears, and the rest of the refuse, generally called *dag-locks*, had been previously taken away. It is further stated that, had these sheep been washed before shearing, their fleeces would have lost about a ninth part; and that the length of the staple or filaments varies. In a shearling ram, shorn when a lamb, a sample of the wool, cut close to the skin above the shoulder, was three inches and half in length; and that of the breech or middle of the back part of the thigh, three inches and three quar-

ters; of an ewe of the same age, about one quarter of an inch shorter; the average according very exactly with specimens taken from newly-imported Spanish sheep. An instance of the extraordinary length of staple, of four inches and three quarters, is related, which from the scoured fleece, produced a sample more than five inches long. The proportion of fine wool in the fleeces of the Spanish sheep is much greater than those of any pure English breed.

It is farther noticed, that of the wool consisting of whole fleeces taken from sheep which had not more than three or four crosses of the Spaniard, and divided into three sorts, namely, R, F, T, according to the Spanish method, 155½lbs. produced of R, or Rafinos, or superfine 104lbs. more than two-thirds of the whole. And the uniformity of fineness in the improved wool is such, that in shewing specimens from these different parts of the same animal, as the shoulder and the breech, which are generally considered as producing the best and the worst wool, there never were three persons who could agree which was the finest, and many good judges actually decided in favour of the latter.

This wool contains a great deal of yolk or oil, which is apt to catch and entangle the dust of the fields, so as often to form a kind of mat of nearly an inch in thickness; but it is wholly free from stitchel hairs or kemps. Brownness in the wool of any particular sheep is an indication of superior fineness, and such was the colour of the ancient fine-woolled sheep, and we need not look for the cause in any peculiar quality of soil or composition mixed with the wool; it will nevertheless scour white.

Lord Somerville states that this dark brown tinge on the surface of the best fleeces amounts almost to a black, which is formed by dust adhering to the greasy yolky properties of its pile; and the contrast between it and the rich white colour within, as well as that rosy hue of the skin, peculiarly denoting high proof, surprise at first sight. The harder the fleece, and the more it resists any outward pressure of the hand, the more close and fine will be the wool. Here and there a fine pile may be formed with an open fleece, though but rarely.

In the Spanish flock purchased from his Lordship by George Tollet, Esq., the average weight of each fleece in the grease was 5lbs. 13oz.; and the lightest ewe fleece 3lbs. 4oz., and the heaviest ram fleece 11lbs. 12oz., of very good quality. This ram was not thirteen months old at shear day, and was adjudged to weigh 20lbs. per quarter. Mr. Tollet declined the price of two hundred guineas for him, likewise that of one hundred for the use of him during the season. This gentleman does not wash his Merino sheep before shearing, since, from the closencss of the fleece, it is not much liable to the intrusion of dirt: as it does not lose quite half its weight in scouring by the manufacturer, an estimate may be made after that rate of the value of the fleece in the yolk. The fleece of the young ram produced upwards of thirty-five shillings, and the average produce of the whole unwashed Merino wool eighteen shillings and nine pence each fleece. The price of the superfine, more than four fifths of the whole, six shillings and three pence, and six shillings per pound of the third sort, or *fribs*, which was about one pound in the whole quantity.

It is mentioned by Mr. Bartley, that four wethers of this breed produced the quantity of thirty-five pounds three quarters of wool; and of several ewes which produced eight pounds each, and of a wether which gave ten pounds and a half.

The Merino breed was introduced into this country by George III., and his Majesty's first

flock was imported in 1792; but other nations seem to have got the start in this respect, as Sweden had them even in 1723, where they have since greatly increased; and in France, Germany, and some other states, they were probably known long before. They have lately spread much in this country, and been greatly improved in different respects by judicious crossing with other sorts. From his Majesty's flock a great number of the improvers of this breed of sheep have been supplied in the different sales that have been made since its first establishment.

According to Sir Joseph Banks, who had the direction of his Majesty's flock, eight rams and nine ewes were disposed of in 1800. Two of the rams went into Dorsetshire. An experiment is noted of three two-year old sheep, a real Dorset, an half Spanish and half Dorset, and a ditto Mendip. The first being slaughtered, reckoning the two years' wool, yielded four pounds five shillings and sixpence; the second, four pounds three shillings and eight pence; the third, three pounds nineteen shillings and two pence. The King's flock of a hundred ewes and wedders sheared three hundred and ninety-eight pounds of wool, washed on the sheep's backs. Loss in scouring one hundred and four pounds; sorted, it produced two hundred and thirty-four pounds of prime wool, sold at five shillings per pound; thirty-four pounds of choice, at three shillings; twenty-six pounds *fribs*, at one shilling and sixpence.

In 1801, eight rams and twenty-two ewes were sold from the royal flock. More of the rams would have been distributed, but that the foot-rot prevailed among them, as it should seem from the richness and moisture of the land, at Windsor, on which they were kept, since the sheep fed on the dry and hilly pastures of Oatlands were never subject to lameness of any kind. This year one hundred and eight ewes and wedders sheared three hundred and ninety-seven pounds; loss in scouring one hundred and twelve pounds. The sorted wool produced two hundred and thirty-seven pounds, prime at five shillings and sixpence; choice, thirty-one pounds, at three shillings and sixpence; *fribs*, twelve pounds, at one shilling and nine pence.

In 1802, the price of the rams was advanced to six guineas each, and that of the ewes to two guineas, in consideration of the improvements both in carcass and wool, which had taken place in this Merino flock since its being fed in England.

In the sale of 1803, in Kew-lane, the numbers sold, as stated in the Annals of Agriculture, were twenty-four shearling rams, which produced the sum of four hundred and two pounds nine shillings; seven full-mouthed and four-toothed rams, one hundred and seventy-one pounds thirteen shillings and sixpence; fourteen ewes, one hundred and eighteen pounds eight shillings; amounting in all, for the forty-five sheep, to six hundred and ninety-two pounds ten shillings and sixpence: the highest price of the shearlings was forty-two guineas, the lowest six pounds seven shillings. Of the full-mouthed rams, twenty-eight guineas was the highest, and seven and a half the lowest. Of the ewes, eleven guineas the highest, six the lowest. The rams were put up at six guineas, the ewes at two guineas, the prices which were established, as before mentioned. The wool was sold at this time unscoured at four shillings and sixpence *per* pound.

It has been noticed that the size of the ewes in these sheep was somewhat under our pure Ryelands, but above several of our small breeds; heads sharp and well shaped, with

occasionally a black spot or two; wool externally having a dirty tinge, but without the dark brown hue noticed above; ears pendulous; perfect ewe neck, with the sinking or cavity both before and behind the shoulder, the top of which is generally higher than the rump; capacious belly; the animal standing wide and well upon the legs. The rams generally of a good size, some of them large enough for any purpose whatever, and of a great bone, but both flat and symmetrical; several of them were of as good and useful form as need be seen, having compact loins and shoulders, and straight backs. Two or three individuals resembled very strikingly our Dorset and Hampshire stock; the characteristic velvet or silken gloss on the shorn faces of the rams was remarkable, and their countenance put one in mind of the fair-haired human complexion. Mouths by no means fine. The rams were in better case than the ewes, which were very low in flesh, and it was remarked by a dealer present, that in a country market, and unknown, they would scarcely have fetched five shillings a head. Some of them were blind, from cold caught in the winter and spring, a circumstance in itself sufficient to demand shelter for them throughout those periods; yet a Scotch gentleman present averred that he had a Spanish ram which was exposed throughout the whole winter, in his country, with no ill effect whatever. A breeder exposes his Spanish stock in the same way in Essex, even during the snows; but on this Captain M'Arthur very rationally observed that a few solitary instances were an insufficient foundation for general reasoning. The wool of the rams exposed to sale varied considerably, some bearing a finer fleece than others.

It is said that the large tuft of wool covering the face of the Merino sheep, is extremely inconvenient in northern countries, where they have frequent heavy drifts of snow. It is Lord Somerville's practice to clip this and the leg wool two or three times a year, beginning about six weeks after shearing. Yet in winter, and in very rigorous climates, it may not be proper to leave the head too bare and exposed, the sheep being (at least, according to the ancient opinions) one of the most tender-headed of all animals; and we know, from constant experience, how liable they are to blights in their eyes, and temporary blindness from the effects of cold and changeable weather. These clippings, being reserved, are fit for inferior purposes, and the fleece is rendered more pure and valuable by their absence. The tufts on the head, and even the *throatiness* or protuberance in the throat, characteristics of the Spanish breed, are discoverable in degrees in some of our native breeds, particularly the Ryeland, shewing their origin. Continental shepherds are solicitous to prevent the fodder from sticking in the fleece of the sheep, lest they should gnaw off and swallow the wool.

This tuft on the head is evidently provided by nature, as a defence against severe weather. We find that the Merino sheep are very apt to catch cold in the winter and spring, and are consequently subject to blindness: the deprivation of this shelter is therefore not only imprudent, but in some degree cruel.

Mr. Knight contends that the produce of a cross with this breed and the Archenfield, or true Ryeland sort, are extremely ugly, and, according to his information, subject to the foot-rot. On some rich pastures in Middlesex, this has also been found to be the case in both the true and the crossed breed.

The Merino rams are sometimes crossed with Devonshire ewes, but the Ryelands are more commonly preferred. Five crosses are consi-

dered as necessary for reaching perfection; and on that ground it is judged that the wool of the first cross can only reasonably be supposed to be worth about seven pence per pound more than that of the maternal cross, on the idea that it will in five crosses be of the value of three shillings above that of the Ryeland ewe, making an improvement of about seven pence in each cross. It is also concluded that if the wool, when this sort is mixed with the most valued native breeds, does not attain its necessary degree of fineness in five crosses, it is unreasonable to expect the full price for it at one cross. It is, however, certain that the animal is improved by a mixture with the Ryelands, and that the wool will not ultimately be found inferior to that of the Spanish stock. The Spanish cross with the South Down and Ryeland, in several degrees, is diffusing itself in many districts with great benefit. With the latter, in Devonshire, the wether produce, at two years old, weighs fifteen pounds the quarter, and affords a fleece of five pounds each, worth three shillings per pound. In other cases, the weight of mutton is greater in the former cross; and the shear of wool from six pounds and a half to seven pounds in the yoke to the fleece at the same age. Crosses with some other fine-woolled breeds are made with great utility in respect to carcass as well as wool.

AT TWO AND THREE YEARS OLD.

Weight *per* quarter, in fat wethers, from 12lbs. to 15lbs.
Weight *per* quarter, in ewes, from 7lbs. to 10lbs.
Weight *per* quarter, in rams, from 17lbs. to 20lbs.
Weight *per* quarter, in the improved sorts, from 14lbs. to 20lbs., and upwards.
Mutton in perfection, as above.
——— quality of, good.
——— time of using, the latter part of summer, &c.

Considering the length of time during which this breed of sheep has been so celebrated for the unrivalled fineness of their wool, it is extraordinary that further and more successful attempts have not been made to improve the form of the carcass and other parts, which have so many acknowledged defects. There is at present too much narrowness, with other improprieties of shape in the chest, and other parts of the bodies of these sheep; the neck has too great a sinking and lowness, and the loose hanging skinny flap under the throat, however it may be esteemed in their native country as favourable to the growth of wool, is a great defect. All these faults, however, might be removed by properly selecting both the ewes and rams in continuance, and constantly taking the best of the produce of each for the successions. By such a method, in a little time, most of the defects of these valuable sheep would disappear, as they have in general good level backs, and are sufficiently well filled behind the shoulder parts. Nor can there be any reason to believe, after the facts which have been adduced on the subject, that a faulty shape is absolutely requisite for the growth of fine wool in any breed of sheep whatever.

By improving the form of these sheep, there is therefore reason to conclude, that a breed or sort would be formed that would have all the necessary and useful properties for the purposes both of the feeder and the manufacturer, and that consequently the sheep would be rendered greatly more valuable than in that state in which they have been so long kept.

The points in which the wool of this breed of sheep excels that of the native fine-woolled breeds of this country are, its being greatly more fine, its being more regularly fine over the whole body, and its being grown in a more large quantity from the same extent of surface on the skin. The first is evident from the pile being so greatly higher, and the fleece having so much more fine in it, than the best of our

finest picked kinds. The greater uniformity in the fineness over the whole sheep renders the produce of the very fine and less fine sorts vastly more abundant. The whole amount of the wool on the sheep is much more in quantity than in those of our fine-woolled kinds of equal size, not in consequence of the greater length of it, but on account of the sheep being more fully and closely covered over the leg parts, or having the filaments more nearly set together on the same surface.

Besides these TWENTY-ONE breeds or varieties, there have been and still exist a few others in several districts, for instance: the

CORNISH BREED, VARIETY, OR SORT.

The true breed of this sort is said to have gray faces and legs; coarse short thick necks, standing lower before than behind; narrow backs; flattish sides; a fleece of coarse wool, weighing about two or three pounds, of eighteen ounces each; their mutton, which is seldom fat, from eight to ten pounds the quarter. From the various crosses which have been introduced into the county at different times, in consequence of the use of rams of the Exmoor, Dartmoor, North and South Devon, Dorset, Gloucester, and Leicester kinds, the pure breed of this description is, it is said, now become rare, but that from the inferior nature and value of its properties, the total extinction of it need not be lamented: the district is now capable of supporting a much better and more improved breed of this sort of animal.

AT THREE YEARS OLD.

Weight *per* quarter, in ewes, from 7lbs. to 10lbs.
Weight *per* quarter, in wethers, from 8lbs. to 12lbs.
Weight *per* quarter, in improved sorts, from 9lbs. to 15lbs.
Mutton in perfection, as above.
——— quality of, good.
——— time of usiug, towards autumn and winter.

In this breed there are many faults in the form, as well as in other more essential properties, which, if the sheep be worth it, might be rectified by proper care in raising them, and greater correctness in crossing them with suitable sorts.

CRAGG BREED, VARIETY, OR SORT.

This breed or variety of sheep is principally met with in a district of the above named sort, and that of Silverdale, in the northern part of the county of Lancaster. These Cragg sheep are greatly esteemed for the fine flavour of their mutton, their ready disposition to fatten, and the fineness of their wool. They are a close, compact, well-made breed of sheep, commonly with white or mottled black and white faces and legs. Their fleeces are short and close in the wool, which usually sells high. Their pasture is chiefly that of the poor, short, rocky, limestone kind. They are deserving of more attention than has hitherto been bestowed upon them by the farmers of the neighbourhoods where they exist; and, probably, by being crossed with other fine-woolled sorts, much improvement might be produced.

AT TWO AND A HALF YEARS OLD.

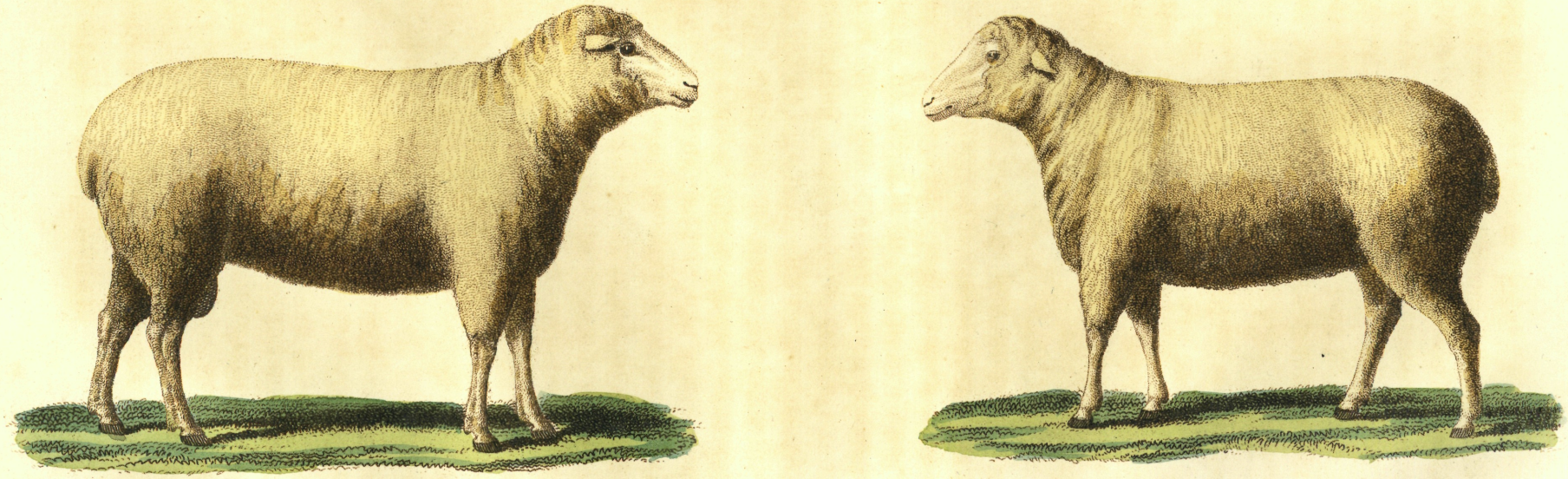
Weight *per* quarter, in wethers, from 9lbs. to 15lbs., and more.
Weight *per* quarter, in ewes, from 8lbs. to 12lbs.
Mutton in perfection at the above age.
——— quality of, very good.
——— time of using, from middle of summer to winter.

This breed is said to have a great resemblance and some affinity to the Dorset kind. It has much excellence both in its mutton and wool, which might be so improved in weight and quality, by proper selection, as to increase their value and usefulness very considerably, and render them peculiarly fit for many sorts of keep of the Upland kind.

Merino & Ryeland Breeds.



Merino.



Ross or Ryeland.

London, Published by Thos. Kelly, *17 Paternoster Row, June 1 1822.*

WINDSOR FOREST BREED, VARIETY, AND SORT, OR HEATH-CROPPERS.

This is a small ill-shaped breed, of but little value, found abundantly in the parishes which lie within the precincts of the forest of Windsor, in Berkshire. It is a breed which affords a very sweet kind of mutton: a quarter will weigh, on the average, twelve pounds; and about thirteen fleeces of the wool will make a tod. It is of equal value with that of the South Down breed. The term *heath-croppers* is very commonly though absurdly applied to sheep of this breed. They have not yet been improved by any cross, but they are a sort of sheep which are much in want of improvement, either by that means or by more exact selection than has hitherto been bestowed upon them.

AT THREE YEARS OLD.

Weight *per* quarter, in wethers, from 12lbs. to 15lbs.
Weight *per* quarter, in ewes, from 9lbs. to 12lbs.
Mutton in perfection, as above
——— quality of, very good.
——— time of using, towards the end of summer, and in the autumn.

DELAMERE FOREST BREED, VARIETY, OR SORT.

This breed of sheep is found about the forest of that name, in the county of Chester. In point of shape, they are said to resemble those of a diminutive Norfolk sort, having the faces and legs black, gray, brown, and white, generally with small horns. This breed is small, the wethers not weighing more than about ten pounds the quarter on the average, at four years old. The mutton is in common much esteemed, and the wool is valuable, selling not long ago, at two pounds twelve shillings and sixpence the stone of twenty pounds, the fleeces are, however small, often not weighing more than two pounds. The wool is commonly purchased by the manufacturers of cloth in Yorkshire. It is a breed that wants improvement in some method, either by carefully using the best in continuance, in raising them, or by giving them such a suitable cross as may increase their size, and, at the same time, render the weight of wool heavier, as by such means they would become more useful, and give a better profit.

AT FOUR YEARS OLD.

Weight *per* quarter, in wethers, from 9lbs. to 12lbs.
Weight *per* quarter, in ewes, from 8lbs. to 10lbs.
Mutton in perfection at the above age.
——— quality of, good.
——— time of using it, the end of summer and beginning of autumn.

MUGGED VARIETY, BREED, OR SORT.

This mugged or muffed breed of sheep is of little value, either for the mutton or the fleece.

But it is a singular breed of sheep, which formerly prevailed throughout all the lowlands of Northumberland: they have a short, coarse-curled wool covering their heads, faces, and legs, and which grows down to their feet: in form, they resemble hill sheep; their shoulders low and sharp; sides flat; backs rather arched; loins thin. It has been suggested, that this mugged appearance may have been the result of a Spanish cross. This sort of sheep have extended to Yorkshire and other neighbouring districts; and many traces of them are still visible, although they have long since given place to sheep of the long-woolled kinds.

AT THREE AND A HALF YEARS OLD.

Weight *per* quarter, in the wethers, from 9lbs. to 14lbs. or more.
Weight *per* quarter, in ewes, from 7lbs. to 10lbs.
Mutton in perfection, as above.
——— quality of, pretty good.
——— time of using, the latter end of the summer.

WELSH BREED, VARIETY, OR SORT.

These, which are the most general breed in this hilly district, are small-horned, and all

over of a white colour: they are a neat compact sheep. There is, likewise, a polled short-woolled sort of sheep in these parts of the country, which are preferred by some graziers.

The genuine Welsh mutton, from its smallness and delicate flavour, is well known, and sold at a high price. It is highly esteemed; but so much half-starved ill-fed meat from various districts is sold under the denomination of Welsh mutton, that many dislike the name of it, and think there is not so much nutriment in the mutton of this, as in that of larger breeds. Indeed, the fattening of the small Welsh mutton has not in general been found to answer in the southern districts of the kingdom. Certainly this is a breed which stands in need of much improvement, and which the sheep-farmers of that district would find to their advantage to put in practice. The crosses, in this case, which require much care and attention, should be with the somewhat larger finer woolled breeds that afford good mutton. Some persons are of opinion, that the Welsh are the original of all the different breeds in the island.

This is, however, too small a breed to be rendered of much utility any where but on the mountains, where they are usually found, as they would pay but little for any sort of improvement.

AT THREE YEARS OLD.

Weight *per* quarter, in wethers, from 8lbs. to 12lbs.
Weight *per* quarter, in ewes, from 6lbs. to 10lbs.
Mutton in perfection, as above.
——— quality of, excellent when fat.
——— time of using it, in the autumn and winter.

IRISH BREED, VARIETY, OR SORT.

These sheep are supported by very long, thick, crooked, gray legs; their heads long and ugly, with large flagging ears, gray faces, and eyes sunk; necks long, and set on below the shoulders; breasts narrow and short; hollow before and behind the shoulders; flat sided, with high narrow herring-backs; hind quarters drooping, and tail set low. The Irish breed of sheep are said to be in every respect contrary to what it is apprehended a well-formed sheep should be. However, since the period in which the above description of Irish sheep was given, many useful and important alterations and improvements have been produced by judicious selection and crossing; and there is no doubt, as the spirit of improvement has extended itself to Ireland, but the Irish sheep will soon become as valuable as the English. It should have been observed, that the sheep of Ireland have no horns: they are in general small, but make excellent mutton, believed by some to be far preferable to the Welsh.

AT TWO AND THREE YEARS OLD.

Weight *per* quarter, in wethers, from 18lbs. to 20lbs. and upwards.
Weight *per* quarter, in ewes, from 14lbs. to 18lbs. or more.
Weight *per* quarter, in Wicklow-hill sort, from 12lbs. to 17lbs.
Mutton in perfection, at the above ages.
——— quality of, very good.
——— time of using, from May to near Christmas.

SECTION II.—*Points and Circumstances to be attended to in the Breeding of Sheep-Stock.*

THE same attention and correctness which have been shewn to be so requisite in breeding and improving neat cattle-stock, are no less necessary in rearing and improving sheep. In the latter as well as the former practices and management, there are many different points which require to be fully understood, and strictly adhered to. As it is now well ascertained by numerous trials, that the more an animal advances towards the state of perfection in its external form and appearance, and in the shape of its

particular parts, the more and better it will in general thrive and put on flesh and fat, it must be material to be well informed respecting the true nature, connexion, and disposition of the several parts which serve to form and constitute such excellence and perfection in this sort of animal. But as this kind of live stock is found to take on flesh and fatten well under some variations and differences of form, it may be proper to allow more latitude in this respect, in this case, than in some others, though an exact symmetry of shape ought constantly to be kept in view, as a matter which very greatly interests the breeder, feeder, and consumer, although the butcher may disregard it. Sheep should in general be bred so as to make the least possible offal, to lay the flesh and fat on the most valuable parts, and so as to give the greatest quantity of meat and wool in proportion to the food consumed.

In the business of breeding sheep, there are, of course, many circumstances which are of material importance, and that demand full consideration; such as the most proper *form* in the whole, and in particular parts, *disposition* to fatten or take on flesh, *early maturity*, *hardiness*, *size*, *nature of flesh*, *offal*, *wool*, *consumption of food*, and also the *sorts*, what are most useful in different situations and intentions, with the means of effecting such intentions in the best and most correct manner.

FORM, OR SHAPE.

That form of the sheep, which is found to take on flesh and become fat in the readiest manner, at the most early period, and to the greatest advantage, producing at the same time good wool, would seem to be the best and most useful.

The appearances in the external form of sheep, which denote them to be good, are, a smallness in the head and adjoining parts, rather a thinness and shortness of the neck, a good depth and width in the breast, a wideness and fulness over the shoulders, a broad straight back and loin, with a deep well barrel-formed carcass, a smallness of bone, small feet, the joints rather short, the muscular flesh full and plump, with a thinness at its tendinous insertion; the skin moderately thin and mellow, of a fine texture, the colour being a clear red and white; the wool neither very long or short, but of a creamy appearance and curly, being thickly set; the flesh and fat soft, with a sort of firmness in handling; the countenance pleasant, and the disposition quiet. Where sheep are inclined to be bad, the contrary of these appearances will always be present in a larger or smaller proportion; the head will mostly be short and thick, but occasionally rather long and coarse; the neck commonly long, thick, and hollow on the upper part; the carcass long and thin, the ribs being flat instead of bowing well out, from the spine, in a rounding manner; the shoulders narrow; the loin wanting width; the back crooked, and irregular; the belly gutty; the breast contracted, and not well let down; the legs long; the thigh not full or fleshy; the flesh thin, close in texture, and thick where the ends are inserted; the feet large and coarse; the flesh hard or sticky in the feel; the countenance unpromising; the disposition wild; and the wool coarse and kempy. This kind of sheep is slow in fattening, but the mutton is often good, the grain firm, sweet in flavour, and juicy.

In all cases where the former appearances and points in the forms of sheep are prevalent, and where they are free from the faults and defects of the latter, they may be considered as

of the most proper and useful form for the purposes of the breeder, grazier, and consumer, and as likely to answer their intentions in the best and most effectual manner.

In what relates to the shape of particular parts, there is, however, some difference of opinion, since that which best suits the views of the breeder and grazier does not always prove the most advantageous and useful to the butcher and consumer. They, of course, think that they should be differently formed.

HEAD.

A small regularly formed head without horns, is constantly thought a great excellence in sheep, and some conceive, that the mouth being small, the eyes lively, and not too distant, the face rather narrow, and not too long, the ears sharp, thin, and of middling length, are good indications of health and a thriving condition, while they are, also, favourable for lambing. The butcher, however, generally prefers length of face and size in the head, as denoting them in the other valuable parts, and contributing more largely to his benefit.

NECK, OR SCRAG.

The neck being fine, and not too long, is commonly considered favourable in breeding sheep, as tending to lessen the bony offal in it, which is great in proportion to that in some other parts. Improved sheep are *fine* in the *scrag*, with *little* offal. Some, however, suppose, that this part may be *too* fine; and the butcher in general prefers a well-fleshed long neck, as when this part is not heavy and well covered with meat, it seldom happens that there is so much as there should be in other places, consequently, when it is found on examination, that the scrag, and the part about the tail, are full and well covered with meat, there is little doubt of there being plenty in other parts; but if they are thin and small, without sufficient fulness, they are considered deficient in weight and otherwise improper, as furnishing that which is not wanted, more bone and fat. A good scrag is, therefore, generally the object of the butcher.

CHINE.

The part extending along from between the shoulders, which is now supposed of the best form, when rather wide and full, but not hollow or cloven, being always well filled up with flesh, as where this is the case, the weight of meat will be greatly increased in proportion to the bone or offal. The butcher in all cases rejects sheep which are depressed, and want flesh in this part; as being deficient in a portion of fine meat. When they cut deep and meaty in this part, they are said to have a fine chine, which is produced by the thin light bony processes of the part being lengthened, and admitting more flesh, as when they are short, there must be a hollowness and want of flesh, and, consequently, a bad chine.

BACK.

This part being every where broad, straight, and even, without any sort of improper rising in the spinal part, is generally held to be a great perfection in sheep; as when they are narrow, crooked, and uneven in that part, there is a want of flesh, which marks a deficiency in other respects: the butcher finds that they are generally light in flesh, have too little in proportion to the fat when put into that state; on the contrary, when it abounds on the outside of the back, there is commonly more, also, within, and, consequently, less waste.

LOIN.

This should continue equally broad and straight with the back in well-formed sheep,

and be fully fleshed in all its parts, as it is equally to the interest and advantage of the breeder, grazier, butcher, and consumer, to have full-loined sheep.

RUMP.

This, in perfectly-formed sheep, should be rather lengthy, continuing its width in a regular manner, to the joining of it with the tail, where it should become narrow, which prevents its declining too suddenly, and gives it a fulness which affords beauty and utility.

TAIL.

It should be set on rather low, but not too much so, being full and well cloven, so as to form a good degree of projection; the part joining the rump and cushion, being rather thick and full with flesh and fat, but gradually narrowing towards the lower end, so as to become small. These two parts, and the loin being well formed in these respects, are sure to please the butcher, and they are not less beneficial to the feeder and consumer.

BREAST.

The breast should be wide, deep, and full, being well extended, and projecting between the fore legs, so as to have a due and exact proportion to the other parts of the body; but by no means too large, it being of no great value. There should be no loose flabby skin hanging down on any part. The butcher never prefers sheep which are disproportionably large in this part, as is the case with some improved breeds.

SHOULDER.

This should have a suitable wideness, roundness, and fulness of its parts, the inside as well as the outside, being well filled with flesh above, and quite down to the knee-joint, which should be fine, the blade part being also well covered at the top. This make of the shoulder in sheep is in general the most suitable to the uses of the grazier and consumer, and the butcher is generally well pleased with it.

FORE FLANK.

This part should be strong and fleshy in the true-formed sheep, in order that the belly may be well held up, and prevented from being gutty. It should join neatly with the breast and shoulder forward, and the barrel part backward, being free from too much fatness. It is not profitable either to the butcher or consumer, that it should be much loaded with loose light fat, as is the case in some improved sorts of sheep, for the breast and shoulder have always plenty of it, if there be any at all on the sheep.

BODY OR BARREL.

The body or barrel part in sheep of a good form should be deep and well rounded, so as that one rib may rise a very little above another all the way from the shoulder to the hip, each being neatly rounded out, and well let down, so as not to appear short, but to give a good mould to the whole. The hip should round equally with the last rib, which should be so formed as to lie even, and so near to it that the sheep, when empty, may shew no hollowness; and the whole should be well covered with flesh and fat, so as to produce uniformity and exact proportion in the appearance. Too high and too great a roundness or shortness in the ribs of sheep give equally an imperfect form to the carcass; so that a due degree of rounding and of length in such parts is in every respect the best. Short-ribbed sheep are disliked by the butcher, as weighing light in the scale

HIND FLANK.

This should be full, and well extended into the cod, so as to unite or form in the best manner with the different connecting parts, and give them the necessary fulness.

TWIST.

The part between the thighs, which should have a degree of fulness, and be cloven as low as possible, so as to join neatly with the rump, and render the top of the thigh full, which is of much consequence to the butcher, who particularly desires them to be good in this part.

HIND LEG, AND FEET.

The outer side of the thigh part should be regularly full from the top, and have the flesh extending as low down on the leg as possible, which last should be straight, and the whole not be too long, but both within and without be properly full and plump in flesh, without giving too much width in the gait; as a roundness, fulness, and shortness, in this joint, is unquestionably an excellence, and the weight material. Such sheep as have too great a width in the haunch parts, are liable to stand too close in the feet, and are generally found light on the inner parts of the thighs, and, of course, prove deficient of weight, as well as fat from the twist being always bad. Sheep should stand rather higher before than behind, and properly wide in the fore as well as the hind legs, the bones in the former being round and straight, in the latter flat, and well proportioned to the size; the joints short and not large; the legs below the knees and hocks being covered with short hair, but not woolly; the hoofs round, and the feet small.

BONE.

The quantity of bone in the different parts, in breeding sheep, should probably be neither too large or too small, but inclining to the latter as much as the nature of the management will properly allow, in order that the amount of offal may be as little as possible, without injury to the size or feeding disposition of the animal; both of which are liable to be greatly hurt by lessening the extent of bone to too great a degree, as there must naturally be a due proportion of bone to the quantity of flesh which is to be put upon it; and, consequently, large mutton requires more than small. How far the reduction of bone may be carried without injury, in these respects, and with a view to the production of the largest amount of good mutton, is a question which has not been decided; but it is clear that it may be carried too far for any useful purpose, notwithstanding the true criterion of the art may be the producing flesh, and not bone.

SKIN, OR PELT.

This, in good sheep, should be of a lively red flesh colour, without any sort of spots on it, and neither too thick or too thin, but rather inclining to the latter, as the former too commonly denotes a coarseness of the flesh, and a bad feeding disposition; while the latter renders the sheep liable to injury by flies in hot seasons, and incapable of standing severe cold and bad weather, in many cases: there should, however, in all cases, be a sufficiency of solidity in the part, to produce the due proportion of wool, whatever the nature or quality of it may be.

DISPOSITION TO THRIVE AND BECOME FAT.

This is a quality in sheep which is of material importance in many points of view, as where it prevails they are far more quickly in a state of thriving and fatness under exactly the same manner, quantity, and kind of keep; having a

more ready means of converting their food into nourishment, flesh, and fat. They will, of course, be in a condition to go off much more early than others, which, for want of this disposition, are often very long in fattening, and, in some cases, never thrive at all. The breeding of sheep, with the above quality, must, consequently, be highly desirable to the grazier, as well as greatly beneficial to the consumer, and, of course, is always necessary to be well attended to in the raising of such stock. There are several other points which require attention ; such as their being bred from sheep that have this property in the greatest perfection; their constantly having good keep ; their bodies being suited in size to the nature of such keep; their parts being relatively well proportioned; their flesh having a free and mellow feel ; their countenances pleasing, and their nature quiet; with a certain perfection of external form in all their parts. In improved sorts of sheep, the taking them from worse to better keep, and continuing to breed in the same line, is believed to have great effect in contributing to their goodness of disposition. It is thought, too, that the finer and closer the wool is in the same sort of sheep, where the shape is good, the better they thrive, and the more kindly they are in their disposition to get fat.

EARLY MATURITY.

The early period at which sheep are ready for use, is a consideration which is not less necessary and important than any other, as it tends materially to increase the profit of the grazier. Early maturity is, therefore, to be carefully attended to and promoted; in doing which, the breed, shape, and wool, are to be well regarded, as they are found, when good, to have much effect in expediting the earliness of perfection; but if these are bad and coarse, their maturity is much checked and retarded. Their being bred as fine and perfect in these respects, as their particular nature and kind will admit, is, of course, essential in producing this highly desirable and useful quality. Size, too, has some influence in the same way, as the smaller sorts of the same kind and shape are in general more early in the perfect state.

HARDINESS.

In the breeding of every sort of live stock, this is a material object, as without it they never succeed to the best advantage. It is a quality which appears to be very closely connected with a peculiarity of shape in the animal, and which materially depends upon the several points of formation. In sheep, that form of carcass which is the best proportioned and most correct in all its parts, is found to be much more capable of withstanding the severities of bad weather and indifferent keep, than an animal which is thinly, crookedly, and badly made, in many of its parts. What effect the nature and quality of the wool may have in this respect, has not been fully ascertained; but such sheep of the same kind as have a good form, and are clothed in a close fine fleece, are found to have great advantages over those of defective forms and inferior qualities of the wool, in sharp pinching seasons and times. The nature of the skin, or pelt, may likewise have some influence in giving hardiness to sheep, as where it is too thin and loose in its texture, they must be less hardy than where it is firm and of a moderate thickness.

SIZE.

This is a matter of much consideration, as it greatly affects both the grazier and the consumer, as well as the wool-dealer; for though it must constantly be regulated by the nature

of the keep, yet the larger the size of the sheep of any sort, that can be well kept and supported on the same kind of land, the less will be the quantity or proportion of offal. Smallness of size, on the other hand, always tends to increase it; as where one or two large sheep have the weight of two or three small ones, the offal will be increased nearly in the same proportion, and, consequently, the loss must be very considerable; especially if it be admitted, that large sheep require but little if any more food than those of the smaller sort, which fact late trials seem to support. Small-sized sheep may, however, be proper on many occasions, as being more hardy, less inconvenient, and more ready in thriving and fattening. Their mutton is also much preferred by the consumer, and there is more profit in the offal of the same weight of meat, which are great advantages to the butcher.

NATURE OF THE FLESH.

This is a property of much consequence in the breeding of sheep, as the quality and value of the mutton depend very materially upon it, for the finer and closer the grain of it can be produced, the more excellent it will prove in the taste and appearance, the loose flabby sorts being far inferior in these respects. The colour should also be carefully attended to, and where there is any thing improper in it, it should be corrected as soon as possible in the breeding, by altering it in the parents. The difference in the texture of the meat may likewise, in some instances, be the cause of its more quickly or slowly running into the state of putridity in hot seasons; as that flesh which is more loose and open may the sooner part with its heat, and become stiff and keep better at such times, which late experiments seem to prove, though the contrary was formerly believed. Age is found to have a considerable influence on the goodness and flavour of the flesh in sheep; therefore the time in breeding, so as to have it ready, and in the best perfection at the earliest period, is a matter of much importance in various ways.

OFFAL, OR LESS VALUABLE PARTS.

In the breeding of sheep, a proper lightness of offal, whether in the head, horn, bone, feet, tallow, fat, entrails, pluck, blood, or skin, is very material, as distinguishing their goodness. It has much to do with the nature of the breed and the form of the sheep, as most of the thin-fleshed, less fat sorts, have more of it than those of the fuller fleshed, more fat and improved kinds. As sheep which are productive in offal mostly require much longer time in taking on flesh and fat than others, such sheep should be chiefly bred as are the most disposed to increase the quantity of good meat in a short time, and not those which are inclined to convert their food into those less useful parts by long keeping. The butcher, however, whose profit is much connected with the quantity of offal, almost constantly prefers such sheep as are likely to afford it in the largest proportion, without regarding the form or kind.

WOOL.

As it is now ascertained that the advantages both of wool and mutton can be combined in breeding sheep, the great object should be the production of improved wool and good mutton, whatever the nature of the breed or sort may be. This is materially interesting to the stock-master, as he may thereby greatly enlarge his profits, while his flock is improved and benefited in a high degree. In uniting the two products, and improving the former in its quality and weight, an almost incalculable benefit

may be produced, which careful breeding will generally effect. The rendering of the wool equally fine and good on every part of the body as much as possible, and the producing it well on the belly, so as to protect the udder in a perfect manner, are points which also demand great attention in the practice of breeding sheep: but the having it in tufts on the poll or cheeks is thought improper and injurious.

CONSUMPTION OF FOOD.

As some sorts of sheep thrive and become fat on much less food or keep than others, it is material in breeding them, that those which produce the largest proportion of good mutton and wool at the smallest expense of feed or keep should be preferred. In this breed good form and size seem to have much to do, as with these large sheep are found, in late correct trials, not to consume so much in proportion to their weight as small sheep; and, of course, they must, in most cases, be more beneficial to the breeder, feeder, and consumer. The most favourable breeds, forms, and sizes, in this view are, therefore, as much as possible, to be employed in the raising of sheep-stock of all kinds, as by such means very great improvement and advantage may be gained.

SORTS MOST USEFUL.

It is evident, from what has been said, that those sorts of sheep which most abound in the perfections, good properties, and productions, that have been noticed above, will be the most favourable for breeding from, and for producing sheep, which are the most proper and suitable for all the different situations, uses, and intentions of the stock-farmer and the public.

MEANS OF EFFECTING THESE PURPOSES.

These are the practices of nice, extensive, and exact selection, breeding in-and-in, and of crossing the families, and, occasionally, the breeds, in the manner that has been already described. By the former of these, the regularity and uniformity of the general shape, the form of body, and its particular appearance, as well as that of the different parts, will be the most effectually preserved and kept up; while by the latter, the health, bone, and size, of the sheep, and the improvement of the particular points and products of it will be secured and produced. Much nice attention and careful adjustment of the several matters are, however, constantly necessary in the several cases, in order to execute the business in the most proper, exact, and complete manner; as it would seem, that by going too far with some of the practices, as the breeding in the same line, and crossing, great injury and mischief have been produced: in the former, by giving too great a delicacy and fineness in different parts, and reducing the bulk; and in the latter, by contributing to impair and injure the forms and properties, and lessening the produce of wool and mutton.

Breeding in-and-in, or in the same line, should, therefore, probably be only proceeded with so long as no injurious effect be produced on either the particular parts, or the general frame of the animals; but the instant either of these effects are in any way indicated, it should be directly desisted from.

Proper crossing should then be resorted to, so as to correct the fault and rectify the mischief, but should not be carried further than is absolutely necessary for these purposes; when the breed should be carried on in the same line again, by which means every thing will probably be kept in the best and most regular order, and the least faults be committed in the raising and improving of sheep-stock. This practice is equally to be attended to, with the view of

making any particular alteration or improvement, and in the general management of the business.

The useful crosses in sheep have been already described, in speaking of the breeds.—See *The different Breeds of Sheep.*

On the whole, there can be no sort of doubt, but that almost every good property may be gained or improved by just and full selection in the breeding of sheep, as it applies to the fleece as well as the form of the animal. For though food, soil, and climate may have some power and influence on the last, it is less than is commonly believed, as it is rather the quantity than the quality that seems to have the effect. Full keep has the power of producing a less fine fleece, but without causing any other bad consequences; and inferior sort of food, though it may afford a wool that has the appearance of fineness, it is often of a tender quality and improper for many purposes. The supply of food, therefore, in this intention, should be as regular as the nature of the business will permit; as by that means there will be the most exactness in the state of the whole fleece as to thickness and thinness over the whole body. In short, the change which is capable of being made in breeds of animals by careful, exact, and extensive selection, is hardly to be conceived by those who have not been in the practice.

Section III.—*Comparative Advantages and Disadvantages of several Breeds and Sorts of Sheep.*

Different sorts of sheep have favourable or unfavourable qualities and circumstances attending them, in relation to many different points and particulars; such as the consumption of food to mutton; to the size and readiness in feeding in different sorts; to the quantity of offal and tallow, or less valuable parts, to the weight of carcass; the proportion of bone to meat, and different other matters.

CONSUMPTION OF FOOD TO MUTTON AND SIZE, &c.

In the view of deciding and clearing up some of these difficult, but very interesting and necessary, circumstances and particulars, which require to be well known and understood by the sheep manager, a very important and useful experiment was lately made under the direction of persons of much experience and nice observation, in Sussex; which, so far as one trial goes, seems to be decisive of several points and qualities in the four different sorts of sheep subjected to it.

Seventy-three wether lambs of the preceding spring lambing, of the several sorts given below, from the first of which twelve, and the second six of the best had been taken out and saved, before they were cut for rams, were directed to be put into a pasture by themselves for this purpose.

There were then of the

1. South Down sort	seventeen.
2. New Leicesters	nineteen.
3. Half-bred new Leicester and South Down, from same get as above	twelve.
4. Romney Marshes, from Wall's ewes, by his own ram, but from being lambed later, nearly two months younger than the others	seven.
In all . . .	fifty-five.

These wether lambs, put into the pasture in the month of August, were brought up and examined on the 25th of the following June, when twelve of the first sort, and all the third, or half-bred sorts, were ascertained to be in a marketable condition; but that none of the second or fourth sorts were in any state for that purpose.

Ten out of the twelve of the first sort were sent off to market a few days afterwards, and brought thirty-four shillings each; and ten of the twelve of the third or half breds, had been sent to the same market a week before, and fetched thirty-three shillings each; which were apparently the better sheep, but they went to a bad market, and low prices.

The two remaining half-breds, which were in equal condition for sale, were kept back, as forming part of the proceeding trial.

It is necessary, however, to notice, that the experiment is already decisive of one point, namely, that at this age of sixteen months, those two breeds were so much more advanced than the others, that they might be profitably cleared from the land, and fresh stock sent in. It will remain for the future progress of the trial, to ascertain whether such fresh stock would not pay better, than continuing the old; and for this purpose, it may be calculated, that the sheep now sold as above, at thirty-four shillings, with the addition of three shillings for wool, pay for sixty-four weeks, sevenpence the week, from the time of their being lambed; which is a very considerable profit: and that if it should turn out that keeping them much longer is not attended with an advantage somewhat proportionate, it will clearly prove the superior benefit of that breed or sort, which may be cleared off at so early an age. It is worthy of attention, too, that not one of the second sort being in any fit condition for being drawn off in the first lot for sale, is a circumstance most strongly in contradiction of assertions without end, that fattening at an early age, is almost exclusively a characteristic of that breed or sort.

But to proceed with the trial:

	Weighed. lbs.	*Ten Weeks' Gain.* lbs.	*Gain per 100lbs.* lbs.
Sept. 7, 1 South Downs	273	33	13
2 Leicesters . .	258	46	21
3 Half-breds .	294	34	13
4 Romneys . .	270	34	14

This result is not very different from what might have been expected; for as the fourth and the second sorts were very much behind the first and third kinds ten weeks before, it was reasonable to believe, that when they did begin to thrive, it would be in a more quick manner.

	Weighed. lbs.	*Loss in 12 Weeks.* lbs.	*Loss per 100lbs.* lbs.	oz.
Dec. 1, 1 South Downs	264	9	3	0
2 Leicesters . .	251	7	2	0
3 Half-breds .	282	12	4	0
4 Romneys . .	269	1	0	6

In all trials of this nature, it is very material to note the losses, as making such attempts doubly useful, by not only shewing when the sheep thrive, and which do the best, but equally so by marking when they go backward, and which breed or sort is most capable of withstanding those causes and circumstances which operate against them all. In the above scale, the difference is not very material. In that lot which answered the worst, the loss, it is seen, amounts to about one penny per week; but it is further remarked, as a circumstance unfavourable to every one, that in a period, (including the best part of the autumn, when sheep should thrive, and when the weather is suitable,) deep into the month of November, none of them should have gained, which in such a case, they ought to have done considerably. Their pasture, though good in kind, was, however, bare.

This result having been found, the sheep were ordered to be starved for twenty-four hours; and then to be turned out for other twenty-four hours; the intention being by thus weighing them in these different states, to ascertain the quantity of food eaten, and the

quantity voided: it being rightly conceived, that if upon the repetition of such trials, there existed any remarkable superiority, or any material difference, between the respective breeds or sorts, it might throw some light upon the general inquiry.

	Loss by starving. lbs.	*Loss per* 100*lbs.* lbs.	oz.
1 South Downs	8	3	0
2 Leicesters	11	4	0
3 Half-breds	17	4	6
4 Romneys	5	0	14

The whole of the sheep were then turned out, and twice weighed, after twenty-four hours eating each time.

	Gain in 1*st.* 24 *Hours.* lbs.	*Gain in* 2*d.* 24 *Hours.* lbs.	*Total Gain.* lbs.	*Gain per* 100*lbs.* lbs.	oz.
1 South Downs . . .	1	6	7	2	10
2 Leicesters	6	6	12	4	13
3 Half-breds	10	9	19	6	12
4 Romneys	0	5	5	1	13

The results of these weighings shew, that the third or half-bred sorts lost most, and gained most; that the fourth or Romneys, lost the least, and ate the least; that the second sort lost more than the first, and ate more. Such trials must, it is well remarked, be repeated many times, before conclusions can be fairly drawn. How the Romneys in the first twenty-four hours, could gain nothing, is not to be accounted for, as the weighing was performed with accuracy.

March 30, in the succeeding year, weighed again.

This weighing, as it marks the loss sustained, during the severest part of the winter-season, is deserving of particular attention. The sheep were at grass during the whole season.

	Weighed. lbs.	*Loss in* 4 *Months.* lbs.	*Loss per* 100*lbs.* lbs.
1 South Downs . .	253	11	4
2 Leicesters	214	37	14
3 Half-breds . . .	253	29	10
4 Romneys	254	15	5

In this result, it is remarkable, that the second sort suffered most; from which it may be fairly concluded, that so far as one trial goes, the great peculiarity of that breed or sort is not by any means what has been contended for, a capability of supporting itself on little food; but, that on the contrary, it demands a very plentiful nourishment, and will bear the want of it worse than any of these other breeds or sorts.

The third sort, or half-breds, are the next in the order of demerit: the first sort are the best of all these kinds.

JUNE 19, WEIGHED AGAIN.

	Weighed. lbs.	*Gain in* 12 *Weeks.* lbs.	*Gain per* 100*lbs.* lbs.
1 South Downs . .	299	46	18
2 Leicesters	275	61	28
3 Half-breds . . .	310	57	22
4 Romneys	317	63	24

The period from the preceding weighing to this, as taking in the whole flush of the spring growth of grass, necessarily forms another interesting portion of the experiment. And here, too, the result is said to be remarkable, and strongly in confirmation of what has been already stated in respect to the second sort; for, when in favourable circumstances, in regard to food, as in the present case, from season, it exceeds all the rest. The fourth, or Romney sort, however, approaches near to it; and as these had lost in pinching circumstances much less, their superiority upon these two weighings seems to be clearly ascertained; which will appear plainer, by comparing the weight of December the 1st. with that of June the 19th.

DEC. 1. JUNE 1.

	Weights. lbs.	lbs.	*Gain.* lbs.	*Gain per* 100*lbs* lbs.
1 South Downs . .	264	299	35	13
2 Leicesters	251	275	24	9
3 Half-breds . . .	282	310	28	9
4 Romneys	269	317	48	17

The merit or advantage of the fourth or Romney sort, in this stage of the trial, are conspicuous: the first or Down sort next, the second and third sorts or Leicesters and half-breds are equal.

SEPTEMBER 7, WEIGHED AGAIN.

	Weighed. lbs.	*Gain per 100lbs.* lbs.
1 South Downs	316	5
2 Leicesters	312	11
3 Half-breds	310	8
4 Romneys	337	6

The second sort, or Leicestershire, continue to take the lead throughout the summer. So long as the food is plentiful, they beat all the others; and this part of the experiment goes to prove a most important point, which has indeed been long suspected, that in good situations no breed or sort is so profitable to the grazier. The third or half-bred sorts are found to be the next to them.

The five remaining Romneys had been sent to market on the 4th of July, and brought forty-eight shillings each; and on August the 7th, ten of the remaining Leicesters went at forty-eight shillings, and seven at forty shillings each. So that the profit for two years and two months' food, added to the value of the wool, is, it is said, five pence and a fraction the week for the Romneys, and from four-pence to four-pence halfpenny for the Leicesters, from the time of their being lambed.

It will be seen, by the former part of the experiment, that the first and third, or South Down and half-bred sorts, in sixty-four weeks' time, gave seven-pence the week profit; and that the fourth and second sorts, or the Romneys and Leicesters, when kept until they were nearly twice the age of the others, namely, 108 weeks the former, and 117 the latter, only gave a profit of from four-pence to five pence the week. This, it is contended, is a most interesting circumstance, and manifestly tends to ascertain how much better it would be to the grazier to clear off these sheep at an earlier age, and re-stock his land with those which are most saleable at the earliest period.

NOVEMBER 21st TO DECEMBER 25th WEIGHED AGAIN.

	Weighed. lbs.	*Gain.* lbs.	*Gain per 100lbs.* lbs.
1 South Downs	320	4	1
2 Leicesters	326	14	4
3 Half-breds	346	6	1
4 Romneys	331	lost 6	lost 1

This is stated, as perhaps the most striking part and period of the experiment. By the preceding weighing it will be seen, that the second or Leicester sort had outstripped all the rest, and that their superiority is still here maintained.

This useful and well-designed experiment tends to show, in a very distinct and satisfactory manner, the particular points and circumstances in which these different sorts of sheep are beneficial, or the contrary. It strongly displays the advantages of the South Downs, and the half-bred sorts, over the others, in the earliness of their becoming ready for the market; and in the quickness of their being got off the ground, when it may be re-stocked with others, in preference to keeping such sorts as require great length of time in getting into such condition. It renders it evident, too, that under a want of food, the latter of these sorts sustains the greatest loss of weight, and when again turned to plenty, increases the most. That the Romney sort, under the same circumstances, experience the least loss, and consume the least food. That the new Leicesters are greater losers of weight and consumers of food, in all such cases, than the South Down sort.

It also proves that in the pinching winter season, when food is scarce, the new Leicester

sort bears the want of it worse than any of the others; that the half-bred suffer in the next degree; and that the South Down sort is the least of any affected by it, consequently the most advantageous in such cases. But that, in the whole of the full and favourable time for keep, the first of these three sorts excel all the others; though the Romneys nearly equal them, and in some other respects are probably more advantageous to the stock-master.

In Ireland, too, an experiment of this kind, in so far as the consumption of food, the increase in flesh, and the readiness of feeding, are concerned, is said, by a late writer, to have been made with correctness, between a large strong sheep of that country, and a fine delicate one of the new Leicester sort, in which the former might have been supposed to eat nearly one-third more food than the latter, and the latter to have fed or become fat in one-third of the time of the former; but that the facts turned out very differently in both these respects, as will be seen below. This trial, which commenced in January, lasted for seventy-five days, or a little less than eleven weeks, the food being hay and turnips, which were weighed and given to them every day; their living weights having been taken when they were first put up, and their respective weights ascertained every fortnight afterwards, in order to determine the amount of their increase.

	CONSUMPTION. *In the large sort.*		CONSUMPTION. *In the smaller sort.*	
	Hay. st. lbs.	Turnips. st. lbs.	Hay. st. lbs.	Turnips. st. lbs.
1st. Fortnight	1 13	10 3	1 13	9 10
2nd. ———	3 12	20 12	2 13	2 8
3rd. ———	3 7	28 4	1 12	28 4
4th. ———	3 7	30 0	2 1	30 0
5th. ———	3 12	24 8	2 7	24 8
6th. Five days	1 6	8 2	0 10	6 4
In the whole time	18 1	122 1	12 0	119 6

	Wt. when put up. *In large sort.* lbs.	Increase. lbs.	Wt. when put up. *In smaller sort.* lbs.	Increase. lbs.
	164		154	
1st. Fortnight	175	11	157	3
2nd. ———	183½	8½	169½	12½
3rd. ———	185½	2	171½	2
4th. ———	189	2½	172	0½
5th. ———	196	7	182	10
	Total	32		Total 28

In the whole of this trial the large sheep seems to have eaten only about six stone one pound of hay more than the smaller, and three stone five pounds more of turnips, the former consuming, on the average, in the proportion of about twenty-two pounds and three-quarters in the day, and the latter in that of twenty-two pounds and a quarter, while the first had the advantage of four pounds in the increase of meat, which makes some little in its favour for the whole time.

And it shows that sheep neither eat or get fat in proportion to their sizes, not even those sorts which have been supposed the most favourable for the purpose, as the smaller of these sorts of sheep have been generally believed to feed quicker, and eat less food than almost any other kind. While large sheep are well known to require, in common, much longer time in fattening.

The increase in the feeding of these sheep appears to have been very irregular in this experiment; but there is no circumstance stated, so as to throw any light upon the matter; it is probable, however, that if the trial had been made at a different season, and under other circumstances, the result, in some respects would have been very different.

PROPORTION OF OFFAL, OR LESS VALUABLE PARTS, TO CARCASS.

In regard to the proportion between the quantity of offal, or less important parts, and

the weight of carcass in different sorts of sheep, and those of the large and small kinds, it must necessarily be much regulated by, and depend upon, a variety of different causes and circumstances in the breeding, rearing, and management of them, as well as the form and length of trial in fattening. Consequently, to arrive at it in the most exact and certain manner, and so as to be of any utility, it should be taken in the less fed states of the animals, and not, as is usual, when they have been very highly fattened, and materially altered from their natural condition, and also selected for the purpose.

It does not appear from the trials which have been made with sheep selected and fattened for the purpose of showing and gaining prizes, that there is any very material difference in the proportion of offal, or less valuable parts, to the weight of carcass between the generality of the larger and smaller sorts, or between some improved and unimproved kinds, though there may often be considerable differences between different individuals of varieties of the same sort, which render them more or less advantageous.

The proportion of the offal, or less important parts, to the carcass weight, in the large kind, being mostly from about a third to a fourth, and in that of the small sort about a fourth. But from the differences in the weights between the large and small sheep, the former must often have much advantage over the latter.

WEIGHTS—ALIVE AND DEAD.

The different proportions which sheep possess and bear to one another, in their less valuable parts, and which in some measure shew their comparative advantages and defects, are thus seen:

IN HEAVY SHEEP.

In three Dishley wether Sheep, at one year old, fed on artificial food, the weights were,

		lbs.		lbs.		lbs.
In No. 1.	Live weight	148	Carcass weight	86	Fat, 12	Offal 50
—— 2.	——	164	——	106	— 8½	— 49½
—— 3.	——	142	——	88	— 12	— 42
	Totals	454		280	32½	141½

Proportion of offal, or inferior parts, less than one-third by ten pounds and one third.

In three Kent sheep, at two years old, grass-fed, there were these weights:

		lbs.		lbs.		lbs.
In No. 1.	Live weight	203¼	Carcass weight	139	Fat 23½	Offal 41
—— 2.	——	229¾	——	158	— 21¼	— 50
—— 3.	——	230¾	——	164	— 17¾	— 49
	Totals	664		461	63	140

Proportion of offal, or inferior parts, less than one-fourth by twenty-five pounds three quarters.

In this last sort there was the advantage of sixty pounds and a half more weight of carcass, with ten pounds and a half more tallow, and one pound and a half less offal, or inferior parts, than in the others; though they had been considered to have their chief excellence in the lightness of their waste or inferior parts. But in good sheep of the former sort, the average of such parts is equal to or more than in the best sheep of other kinds, being in some cases less than one-fourth, and in others more.

In three Dishley wether sheep, at two years old, they had these weights:

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	186	Carcass weight	126	Fat	17	Offal	43
—— 2.	——	188	——	128	—	16	——	44¼
—— 3.	——	199	——	130	—	14½	——	54
	Totals	573		384		47½		141¼

Proportion of offal, or inferior parts, more than one-fourth by a pound and three quarters.

In three two-year old Gloucester wether sheep, grass-fed, there were these weights:

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	271	Carcass weight	177	Fat	20	Offal	74
—— 2.	——	273	——	184	—	18	——	71
—— 3.	——	272	——	184	—	19	——	69
	Totals	816		545		57		214

Proportion of offal, or inferior parts, more than one-fourth by ten pounds.

By these weights it may be seen, that as the new Leicesters averaged so much less in the carcass and tallow in each sheep than the Gloucesters, that the latter had the advantage; as they were more than fifty pounds heavier in carcass, with three pounds more tallow; and in taking the whole of their weight, somewhat less in offal or inferior parts.

And they had some additional advantages in other ways, so as to render them a more valuable sheep.

In the heavy Lincolns, and other large kinds, the advantages seem to be much the same.

IN LESS HEAVY SHEEP.

In three improved South Down wether sheep, at one year old, the weights were,

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	146	Carcass weight	93	Fat	14	Offal	39
—— 2.	——	147	——	93	—	16	——	38
—— 3.	——	149	——	95	—	16	——	38
	Totals	442		281		46		115

Proportion of offal, or inferior parts, more than one-fourth by four pounds and a half.

In three improved South Down wether sheep, at two years old, they were,

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	146	Carcass weight	93	Fat	14	Offal	39
—— 2.	——	134	——	85	—	13	——	36
—— 3.	——	146	——	94	—	16¼	——	35¾
	Totals	426		272		43¼		110¾

Proportion of offal, or inferior parts, more than one-fourth by four pounds and a half.

In two improved South Down wether sheep, at three years old, they were,

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	146	Carcass weight	95	Fat	16	Offal	35
—— 2.	——	161	——	105	—	17½	——	38½
	Totals	307		200		33½		73½

Proportion of offal, or inferior parts, less than one-fourth by three pounds and a quarter.

In three South Down wether sheep of the best kind, they were,

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight . . . . . ,	137¾	Carcass weight	94	Fat	21	Offal	22¾
—— 2.	——	135½	——	92	—	17	——	26½
—— 3.	——	134	——	91	—	17	——	26
	Totals . .	407¼		277		55		75¼

Proportion of offal, or inferior parts, less than one-fifth by six pounds and three quarters.

In two two-years old Cheviot wether sheep, they were,

		lbs.		lbs.		lbs.		lbs.
In No. 1.	Live weight	123	Carcass weight	88	Fat	11½	Offal	23½
—— 2.	——	121	——	81	—	10½	——	29½
	Totals . .	244		169		22		53

Proportion of offal, or inferior parts, more than one-fifth by four pounds and one-fifth.

By these statements of weight the superior advantages of good sheep are rendered very strikingly evident, in their great increase of carcass and the less proportion of offal or inferior parts; and it is equally evident that those sorts which are very much improved have a still further advantage in the increase of carcass and tallow, as well as in the less weight of offal or inferior parts.

It appears, too, that the last sort of sheep, which are a less improved kind, have the advantage of being equally light in their offal or inferior parts, as those which are of the most improved sort.

PROPORTION OF BONE TO MEAT.

The trials which have yet been made in this respect are far from having ascertained this point in a satisfactory manner; but, contrary to what has been commonly believed, they shew the proportion to be very little different in large and small animals, or those of different kinds, when in the same state of fatness. It appears to be in the proportion of from about one and a half to nearly two ounces of bone to a pound of meat. In small sheep there is a larger proportion of bone in some of their offal parts than in large ones, which is a disadvantage to them, and renders them less profitable to the consumer.

In the large Gloucester, in the mixed Warwick, and in the new Leicester sorts of sheep, the proportion of the weights of the heads, of the bones, and of the meat, has been stated to be as underneath:

HEADS.

	Weights of carcass. lbs.	oz.	Weights of head. lbs.	oz.	Weights of bone. lbs.	oz.	Weights of meat. lbs.	oz.
In Gloucester, ...	212	0	7	0	2	4½	4	11½
In Warwick, ...	120	0	5	0	1	15	3	1
In Leicester, ...	88	0	4	0	1	10½	2	5½

NECKS.

	In whole neck. lbs.	oz.	In scrag part cut off neck. lbs.	oz.	In scrag alone. lbs.	oz.	Weight of bone in neck. lbs.	oz.	Weight of bone in scrag. lbs.	oz.	Weight of bone in whole neck. lbs.	oz.
In Warwick, .	10	2	7	0	3	2	0	11	0	5½	1	0½
In Leicester, .	7	0	5	2	1	14	0	7½	0	6½	0	14

From these results in respect to the heads, it is concluded, that taking that part as wholly offal, there are, in the Gloucester sheep, thirty pounds of useful meat to one pound of offal,

or wholly waste parts; in the Warwicks, twenty-four pounds to one pound of offal parts; and in the new Leicesters, twenty-two pounds to one pound of offal parts; which, it is said, "proves that small sheep, with fine heads, carry a greater proportion of offal than the large or even the middle-sized sorts." It is conceived, too, that by the same rule the necks altogether of the Warwick and the new Leicester sorts seem to be nearly the same; but that in the scrag there is a very great inequality, as in the Leicester fine scrag there is only a proportion of four to one of flesh to that of bone; while in the Warwick, the proportion of flesh to bone is as nine to one, which must be greatly advantageous.

In an extraordinary fat sheep of the Welsh kind, in which there was the weight of sixty-four pounds of carcass, the proportion of bone was found to be thirty-five ounces, which is something less than two ounces of bone to one pound of meat, which is as large a proportion of bone to flesh as in the large-sized Warwick sheep.

Much further experiment, however, is requisite, to demonstrate this matter properly.

Besides the advantages or disadvantages which different sorts of sheep may have on these accounts, they may be beneficial or the contrary on many other grounds. In the large sorts, the Teeswaters, the better sorts of Lincolns, the Cotswolds or Gloucesters, and the Romneys, are found to be very beneficial on all the rich full pasture lands, in such districts or others, where sheep become fat without the assistance of artificial food of any sort, as they feed in a comparatively short time up to very great weights, and pay well for their keep, affording less waste than smaller sheep, while they yield a large quantity of wool.

In cases where the pastures for sheep are not of much consequence, but their deficiencies are made up by the full supplies of turnip, clover, rape, rye, tares, and other kinds of artificial food on the arable lands, there is probably not a more advantageous sort of sheep than that of the improved large short-legged Wiltshire kind; as they stand out well under such feeding, and rise to a great weight in a short time, and are much preferable to the smaller sorts in many other respects.

The heavier and better sorts of the new Leicesters and the different mixed kinds of them are an advantageous description of sheep, in many cases where turnips and artificial food are combined with the inferior natural grass and seed pastures, as they reach good weights in fattening in a little time without inconvenience, and are very tame and readily managed.

Of the smaller kinds of sheep the South Down are found to be highly beneficial in many situations, as doing well on the shorter and scantier sorts of keep of the pasture kind, and either with or without that of the cultivated sort, beside sustaining themselves on less and worse keep, yet producing more and better wool; being also kept in greater number on the same extent of land, and getting fat more early than most other sorts.

In different places, from the early production of lambs, the Dorset sheep are very advantageous, but perhaps in none so much so as in those of and near their native situation, as they are not so well fitted for many others, nor can they be made to succeed so well upon them.

The small forest and mountain sheep are in common most useful and advantageous on their native hills and walks, but seldom answer so well when brought into the grounds, which are less open and exposed.

In all these cases it will be invariably found that larger and more beneficial sheep of the improved kinds may be kept without difficulty,

where the more common sorts are in use; and it is of course greatly disadvantageous to have inferior stock of this nature in almost any situation where the better descriptions of it can be had.

Section IV.—*The Ram.*

Since it is found by the store or flock master that the more the ram or male animal approaches towards perfection in its form, the better it will generally be adapted and suited to the success and improvement of sheep stock, it will be of much utility and importance to understand and be acquainted with the peculiarity of shape which is most necessary; which, with what has been already said, seems to be contained in the description given below by an able and experienced sheep breeder; which is, that his head should be fine and small, his nostrils somewhat wide and expanded, his eyes prominent and rather bold or daring, ears thin, his collar full from his breast and shoulders, but tapering gradually all the way to where the neck and head join, which should be very fine and graceful, being perfectly free from any coarse leather hanging down; the shoulders broad and full, which must at the same time join so easy to the collar forward and the chine backward as to have not the least hollow in either place; the mutton upon his arm or fore-thigh must come quite to the knee; his legs upright, with a clean fine bone, being equally clear from superfluous skin and coarse hairy wool from the knee or hough downwards; the breast broad and well forward, which will keep his fore legs at a proper wideness; his girth or chest full and deep, and instead of a hollow behind the shoulders, that part by some called the fore flank should be quite full; the back and loins broad, flat, and straight; the quarters long and full, with the mutton quite down to the haugh, which should neither stand in nor out; his twist or junction of the inside of the thighs deep, wide, and full, which, with the broad breast, will keep his fore legs open and upright; the whole body covered with a thin pelt, and that with fine, bright, soft wool.

Where there are such properties as these in rams, they can scarcely fail to have superior dispositions or be well calculated for bettering such stock. As nature, however, in the improved forms of animals has mostly given a smallness of the mouth and nose, some graziers think that the nostrils should not be too wide or distended, as they are liable to render the lower part of the nose too thick and large; and that the eye being too full and prominent does not indicate good disposition, while that of the quick lively eye is mostly its attendant.

This delineation of form, and the account of the principles of breeding which have been given above, will, however, sufficiently direct the breeder in the choice of rams most proper for his purpose in most cases.

Although in selecting rams for raising and improving sheep stock it has been usual with improved breeders to advise their having small fine features, somewhat approaching to those of the female, with a smallness of bone, yet as such rams are calculated to give too great a fineness to their produce, it would probably be better for them to have greater strength in their limbs and general appearances and more bone, but with rather an under proportion to the usual size between rams and ewes of the same sort. As much care and attention is necessary in providing rams so as to suit them well to the nature and state of the ewes and the alterations and improvements which are desired, it is a good method where it can be done to examine the rams and their produce of the former year in a distinct manner, as by such means the

most correct decision may be formed, and by it and a careful attention in selecting the best ram lambs, a stock may be kept in a constant state of amendment.

In providing rams with this intention, they should have such perfections in their mutton, bone, wool, and shape, as the ewes are deficient in, as by care in these respects the greatest possible amendments in the stock may be produced. In the mutton, colour and quantity, with better grain and flavour, will be necessary to be regarded; in the bone, a proper degree of lightness; in the wool, the improvement of the pile and the quality, in both the short and long-woolled sorts, and rendering them more equal all over the body; which points are to be effected in the former by rams that have short, fine, and closely set wool without hair, and in the latter by such as have different wools of the open, close, or best skin kinds in due proportions. The shape is to be amended by the means which have been already suggested in speaking of breeding and the nature of the cure.

Great attention is necessary in raising young rams, and the best method is probably by means of the ewe produce of young rams which have been selected with proper attention, picking out the best ram lambs from the best ewes; but in sheep stock it is often the practice to put a few of the best ewes to rams which have the best shape and finest and most equal coats of wool, and to save the ram produce of them; and when the breeds are to be changed to procure a few of the best ewes of some neighbouring or other flock, and to put the best rams of the sort used to them, saving the ram lambs coming from them. Some breeders, however, only save the best ram lambs that can be picked out at the time the lamb stock is set, which is a very inferior practice.

In whatever way the young rams are raised, it is necessary that they should be well kept in the early states of their growth, but they should not be forced in the manner they are in some places, for the purpose of show, by the highest keep. Wherever that is the case, they will certainly shrink and decline when they return to natural pasture feeding, so as to become in some measure unhealthy and incapable of getting good stock; whereas if they be constantly raised and fed by ordinary good keep, they will be enabled to stand the severities of bad weather and hard fare more favourably, and be able to get better and more sound stock with greater certainty.

The practice of raising young rams for the purpose of letting, which probably originated in the midland counties, and which has now spread itself into almost every sheep district and part of the kingdom, has been very convenient, and of great service in bettering the flocks wherever it has been adopted without deception and in a properly liberal and attentive manner, as it has relieved the flock-master in a great measure from the trouble and necessity of providing his own rams, by giving him an opportunity of readily selecting and procuring such as he may want from the ram breeder. The breeding of rams is in this way made a sort of separate business, and of course better ram stock raised for the use of the sheep-masters than could otherwise be done.

Young rams should not be allowed to ride too soon, as it is found to injure their growth and perhaps their constitutions and dispositions in a great degree: from a year and a half to two years old is probably the most proper time for letting them ride, though some employ their ram lambs; but that is a practice which should always be avoided as much as possible.

The vigour of the ram is of no very long

continuance; he is mostly in the best state from about the age of two years to that of four or five, when he begins to decline and become less fit for being put to the flock.

The ancients, and especially Columella, have recommended the tall ram, with a pendent and woolly belly, very long tail and thick fleece, a broad forehead, twisted horns, and large testicles, preferring, however, the horn-less breed; and that he should not be used in the flock until three nor after eight years of age.

It appears, too, from the writings of Virgil and Pliny, that the ancients were particularly attentive to the nature and properties of their rams, with a view to the wool, and to the raising their sheep; as besides the state of the colour in the fleece, they took care that the mouths and tongues of them were examined, and where there was the least appearance of any sort of blackness or a tendency to it, they were considered as improper, and carefully rejected, lest the sameness of colour should be given to the fleece in the lambs of their produce. The nature of the ram constantly requires much attention as to wool, as well as some other points and matters of importance in the breeding of sheep; as wherever there are any signs of blackness in any part of the fleece, it certainly denotes a disposition in the animal to the production of a black state of the wool, either in itself or the offspring it may produce, which, in all cases, with a view to the wool, should be cautiously avoided and guarded against.

Every sort of disease and imperfection should be well attended to and regarded in the ram, as the extent of mischief that is sometimes done in these ways is not to be calculated; whole flocks being sometimes nearly ruined for want of sufficient care in seeing that rams are perfectly free from every kind of distemper, whether of the external contagious kind, or those of an inherent internal nature. Their imperfections should likewise be nicely examined and considered. Some breeders think it quite essential for rams becoming productive of their progeny that they should be perfectly formed about the *frenum*, or end of the pizzle, mostly termed the *worm* by shepherds; but there can be little doubt that this may be wanting, and yet lambs be produced in sufficient abundance; but it is always best to have them well formed in this as well as other respects. In some cases, rams that have not been castrated are found to have no testes let down into the scrotum, when they are said to be *close* sheep, and not to be capable of procreating; and though this is probably a mistake, yet all such imperfect rams should be cautiously avoided in the view of breeding from them. In case there be only one stone come down into the scrotum, the ram is called a *ridgel*, and is equally as good and safe a getter of lambs as where no such defect exists; but as there is a certainty of some of the male lambs being got with the same imperfections and faults, which render them extremely troublesome and tedious in their management in the riding season, they should constantly be discarded as an improper sort of ram stock. Where the testes lie quite close up to the back in the loin part of the sheep, such rams are very often found to give but a trifling progeny, and in some cases scarcely any at all; they should, in consequence, be disregarded as rams for the purpose of breeding from.

Section V.—*The Ewe.*

The qualities of the ewe as well as those of the ram should be well attended to. In providing ewes for the purpose of raising sheep-stock, it has been the too general practice to take them without much selection; but there can be no doubt, that where improvement is

intended, they should be chosen with the greatest care and attention, and be regulated and adjusted to the rams in the best and most exact manner possible, in whatever relates to their properties, forms, flesh, wool, and some other points; as without such care success cannot be ensured. Thus, where good disposition, hardiness, and early maturity, are wanted, such ewes should be provided as possess them in a high degree: where goodness of form, such as have it in the most perfection; where there is too great a length or shortness of the bodies, the ewes should be provided with less of these, as they may happen to be; where the flesh is too open or close in the fibre, it should, in some degree, have the contrary qualities in the ewes; and where wool is the object, the ewes should have it coarser or finer as the nature of the case may be; as by such means a better stapled or more proper kind may be produced. By proceeding in this way, amendment will gradually take place in the qualities of the sheep, and the flock will be constantly in the road to improvement.

In beginning ewe flocks it is always of importance to provide such sorts as have the most proper forms and qualities, and which take the best care of their young. The time which is the most proper for the purpose is, probably, when they are one shear, or about a year and a half old; but they are not always to be procured at a rate which will answer the breeder's purpose, in which cases older ewes, of the best kind, which can have lambs two seasons, or more, are generally to be preferred to the refuse shearling ewes of sheep-stocks, as there will be the first set of one-shear ewes from them ready, when the old ewes are drawn. Such ewes are often very useful in this way, however preferable one-shear ewes may in general be supposed to be.

The short fine-woolled ewes are the most suitable for all the short close-grassed pastures, and where there are dry tillage lands in connexion with them, as being the most fitted to their nature and keep: but the long-woolled sort are best for most lands which are alternately in tillage and grass, and for the deep rich pastures, but they should be selected of a size, in proportion to the keep. Thus on the inferior sorts of land, which are occasionally in tillage and grass, and in all sorts of it, where such stock are to be made fat at an early period, or in the lamb state, the best kind of the improved quick-feeding sorts are the most proper, taking care to proportion the size to the quality. On the more damp heavy lands, in the state of old pasture, whether marsh or not, the largest sorts of ewes may be the best, with a view to the keep; and on lands which are calculated merely for raising store-sheep, which are to be sold and made fat in other places, as they are mostly to be kept for some length of time, the ewes should be of the larger kinds, and such as have the best growth, and that can be well supported; their produce in general affording the most profit in the situation to which they are afterwards to be removed.

The lands, in all cases, where ewes are to be put for raising stock, should be quite equal to their keep, without letting them sink in their flesh from any sort of stint in their feeding; as by such good keep they will be in the best state of health and strength, and in the least danger of becoming barren or of not taking the ram, which is often the case when they are either in too fat or too lean and weak a condition when they are put with him. Some breeders, in preparing the ewes for this purpose, have the wool clipped from the tails and the parts about them; but this is a very wrong

practice, as leaving them too much opened and exposed to the cold of the winter months. There is seldom any preparation of this sort necessary in the breeding ewes, as they cannot be bettered and may often be much injured by it. Care should, however, always be taken, that they are perfectly free from all sorts of cutaneous as well as internal disorders, as otherwise accidents and inconveniences may happen.

It has been noticed by the ancients, and especially the writer just mentioned, in speaking of the ewe, that the ewe should come into breeding use at two years old—have a huge body, a long neck, a large belly well covered, and long wool, but not harsh or coarse; the ewe with a peeled, bare, and small belly, being constantly to be avoided.

It is found that as soon as the ewe produces sheeps', or broad, teeth, she is capable of procreation, but it is mostly thought to be sufficiently early if she bring forth about the close of the second year. Her period of gestation, or going with lamb, is from twenty weeks to one hundred and fifty days, and by good keep she may probably be made to breed more than once in the year, but this is rarely the case only in particular breeds.

There is a good practice among the Dorset ewe sheep, which is that of their tails never being clipped or shorn, as they are thereby left more warm and better protected in their udders and parts about them; but the appearance is somewhat disagreeable and disgusting.

In raising new varieties or sorts of sheep, the ewe seems to have the most influence in the produce which is formed, she should therefore be chosen with particular care and attention; but it is the contrary in respect to the growth and production of wool.

PUTTING RAMS TO THE EWES.

In this business, the first thing which is necessary to be done, is properly to distribute the ewes in the pasture fields, or other places appropriated for the purpose. Some prefer large fields or portions of ground for this use, but it is always improper, where it can be avoided, to have them so large as to require several rams in each, on account of the number of ewes they contain, as many inconveniences and disadvantages arise in such cases. The best practice is, most probably, either that of having pastures of a proper extent for containing only the necessary number of ewes for one ram; or when they are larger, that the rams be kept in other pastures, and only let in singly to the ewes when necessary; as in either way, all the hazard and inconvenience of having too many rams together with the ewes will be done away.

The season which is most proper for the general putting of the rams to the ewes must, in a great measure, be regulated by the different situations and nature of the keep which may be obtained when the lambs are dropped, so as to have it in neither too deficient or too full and luxuriant a state at the time: for where the former is the case, they are apt to be checked and injured in their early growth, so as rarely to get over it, and where the latter takes place, they are often subject to great injury and loss. Consequently, in situations where the grounds are dry, warm, and sheltered, it is beneficial to put the rams to the ewes rather early; while in those which are cold, open, and exposed, it should be delayed longer, in order to avoid the risk of too early lambing, though it should not be protracted too late, which would be attended with great danger to both the ewes and the lambs. The state

of the keep at the time of lambing is therefore to be kept constantly in view on these occasions.

The most proper time is, from about the middle of October to the beginning of the following month, according to the nature of the situations. With a view to early lamb, however, different sorts of ewes take the ram several months earlier than this, as in April; but they seldom bring them forth or fatten them so well as the Dorsets, which are the sort principally employed for this purpose, as they take the male more generally at that early period than any other, and fatten them, under proper care, as house-lamb, in a better and more complete manner. In the store ewe-stocks of this district, too, the rams are said to be put to them so early as the beginning of June. But in most other cases, the above will be found to be the most usual time; though by high keep almost any of the sorts may be made to take the ram much sooner, which is a great advantage in the point of early lamb.

The most proper number of ewes for rams of different ages, is a matter of some nicety; but for young rams of from one year to a year and a half old, it is mostly from about thirty or forty to fifty or sixty; for such as are two years old, from eighty to one hundred; and for rams of more than three years old, about sixty; as they cannot serve so many ewes as those which are younger; but it is always preferable to let them have rather too few than too many, as there will be a greater chance of the ewes being impregnated, and less loss and inconvenience from late lambs. The best modes of putting the rams to the ewes have been suggested above; as the too usual method of turning several rams into a flock at once, or in a gradual manner, is highly exceptionable, and must often be attended with bad effects.

The usual time of the rams continuing with the ewes is from a month to six weeks, which, as the latter mostly blossom or become in season every three weeks, gives them a second chance, if they should not have stood to the ram the first time; but a large proportion of the ewes take the ram in the first week.

The only attention which is necessary while the rams are at ride is, to see that they execute their business effectually, which is readily seen by the quantity of ewes coming in season about them at once, as when the rams impregnate the ewes with effect, they do not usually stay long with them; consequently, when a number attend and keep with them for some days, it is to be apprehended that they have not effected their work in a perfect manner; in which cases a change of the rams will be necessary. In all cases where more rams than one are in use, it may be proper to change the rams to some other flock after a fortnight or three weeks' ride, which may occasion a number of ewes, which otherwise would not, being with lamb, and may likewise prevent many circumstances which would operate unfavourably in this way. It is in all cases a bad practice to turn useless rams among flocks at these times, as is sometimes done, with the view of finding out the ewes that want the rams. The use of young rams with the old ones is seldom advisable. Where any accidents happen to a ram which is hired, while at ride, the loss generally falls on the owner.

Before rams are turned to the ewes, it is always proper to examine them well, and see that they are quite free from all sorts of disease, and perfectly formed and right in all their parts. Then if marked with some colouring substance on the brisket and belly parts, they will be ready to be turned to them. If, also, such colouring be applied every two or three

days, for the first week or two, it will be further useful, in not only shewing which ewes have taken the ram, but those which do not stand to him, by their coming over again, and thus the necessity of providing another may be determined.

KEEPING THE EWES WHILE WITH LAMB.

As ewes lamb in the best and most safe manner, when strong, but not fat, at the time of lambing, it is necessary that they be well kept and in a thriving state, without much approach to fatness, as in that condition they produce the best lambs, and take the most care of them. They should be preserved as free as possible from all disturbances, and be well guarded against accidents from dogs, and from being cast in the furrows, or other places of the pasture grounds. Where the nature of the keep is good, without being too full, the most strong and healthy lambs will be produced. Good pastures should, of course, as much as possible, be reserved for the breeding ewes, and as little changed as the nature of them will allow, as the ewes are greatly injured by being hurried from one place to another. Whenever any of them slip their lambs, they should be removed as soon as it can possibly be done, in order to prevent further mischief.

NECESSARY ATTENTION IN LAMBING.

This attention, though highly essential and important in the management of ewe stock, is little practised in general. Without it, however, much loss and inconvenience will often be sustained. Some situations require it much more than others, as those of the rich pasture, and bleak, exposed, marsh kinds, where the danger is great. In the preparation for this business, which is yet but imperfectly known, the first thing is, to choose properly dry and warm pastures for the purpose; and to have them well secured from danger and inconvenience to the lambs in every possible way. The most suitable pasture lands are those which are not too rich, and on which the grass is fine, close, and short. Formerly it was the practice to lamb the ewes over large breadths of land, but it is now thought better, and less troublesome, to lamb them in a more close and confined manner, as in the proportion of ten, twelve, or more, to the acre, as the grass may be, which affords more profit, as well as many advantages in other ways; besides greater safety to the ewes from the nature and state of the keep.

Where the quantity of twin-lamb ewes are considerable, it is now usual, before the lambing takes place, to provide a better pasture for them, as they then require more keep. The nearer this can be done to the middle of the lambing-grounds, the more convenient, and better it will be, as they can be removed more readily, and with greater safety, soon after they are dropped and have been marked for the purpose.

The next preparatory business just before lambing is, that of *clatting* the ewes, as it is termed in some places, which is the clipping away the soiled and dirty wool from under the tails, about the udders, and on the insides of the thighs. Some breeders think this highly useful and necessary, while others wholly neglect it, supposing it to be useless, if not hurtful.

This is considered as a good time to begin marking the several ewes in the face, in the order of their lambing, and to place those of different degrees of forwardness together in proper pastures, to be taken care of in the most suitable manner.

The commencement of the lambing time

varies a little in different, and even in the same situations, as circumstances may happen; but the most usual time is in the beginning of April. Early lambing is, however. always favourable, where it can be done with safety.

The lambing season usually continues about a month; during which it is necessary for the manager to have a constant eye to the ewes, to see that they are not lost or any way injured from neglect.

PRESENTATIONS.

In the actual state of lambing, in all natural cases, it is probable, that the less there is done the better: and that whatever may be necessary, should be directed by the state and appearances of the ewes, which should never be meddled with until there is an absolute necessity. And in the unnatural cases, whatever assistance is given should be employed in a gentle, cool, and deliberate manner, in order to accomplish the business safely.

In every natural presentation, the nose and the toes of the fore-feet of the lamb are the parts that first come forward and present themselves; but it in some cases happens that the head cannot be forced forward, either from its having too large a size, or the passage being too narrow, which is in many instances the case with young ewes. When the shoulder of the lamb is too broad or thick, the birth of the lamb is also frequently retarded, as well as from the dryness or coldness of the state of the weather, the peculiar nature and circumstances of the ewe, and some other such causes. But the most frequent and usual cause of protracted or difficult lambing, is what in some places is termed "crown sel," or that state in the head of the lamb which is stopped by the front bony parts of the pelvis. This is a difficulty, however, which may readily be overcome, by the introducing of one or more of the fingers of the person who is assisting the delivery, and pressing the head of the lamb backwards and downwards, and gently pulling the fore-feet out singly, and by drawing downwards. In this manner, the business will be readily accomplished in most cases.

Unnatural cases are those when any unusual part of the lamb presents itself, or when the assistance of some proper person is requisite to extract it. This not unfrequently happens, and it requires an experienced person to perform it, otherwise not only the lamb, but the ewe also may be lost. The cause of such unnatural presentations may arise either from the undue struggles or stirrings of the lamb in the uterus, or from accidents that have occurred to the ewe. The ewe when in such a condition should be gently driven up to some place of confinement; and after being suffered to rest a short time, should be caught, and laid on her right side: the lower parts are then to be raised, and a person should be ready to assist in keeping her down, while the operator proceeds to extract or turn the lamb in the best manner he can; when if the hind feet come regularly forward, there will be no difficulty; but sometimes one leg only presents itself, in which case the hand must be introduced to catch hold of the other, so as to bring it forward, when the delivery will proceed without further impediment. In cases where the side of the lamb comes forward, it may be discovered by feeling the ribs; the back, by feeling the spine; and the belly, by the soft yielding substance of the part, and by the falling down of some portion of the umbilical cord. But whatever presentation takes place, the person who performs the operation must endeavour to get hold of the feet and bring them first forward, and where this cannot be immediately

effected, every effort must be made to turn the lamb until that purpose can be accomplished. Much experience and expertness are necessary in this operation. It sometimes happens that the lamb must necessarily be cut in pieces, which is done by the means of a blunt-pointed knife, and a small hook is afterwards introduced with the fingers, to catch hold of the divided portions, which are to be brought away. The hind parts of the ewe should be raised during the operation, by which means the extraction of the parts will be much facilitated, and whatever part comes forward should be cut off as far within the passage of the uterus as possible; but all depends on the nature of the case that is to be operated upon.

When twin lambs are in such a state as to come forward at the same time, the ewe should be placed on that side where the lamb is the least advanced, by which means it may be pushed back with greater ease, and the other lamb be more readily brought forward and extracted.

In all cases, at the time of lambing, much care is requisite in the operator, who must not be over ready to lend assistance, great risk being incurred by too much hastiness and impatience; as, though ewes will often be a great length of time in the state of lambing, the pains being weak and slow, they will at last, notwithstanding, lamb well, and without any help. Much difference, however, prevails in this respect; in some the pains are quick and strong, and in others they come on for a short time, and then go off again. But when the pains in the ewes are severe, and there are actual appearances of lambing, with much exhaustion, it will be proper to ascertain the state in which the lambs may be, and decide whether they come right or not. Should the feet be found to present, and the heads be turned backwards, it is not possible that the lambs can be brought forth in that way, while by delay much injury may be sustained by the ewes, and the loss of the lambs is hazarded. In such states it is mostly thought best to turn the lambs and take them away backwards; as in such a position it is very difficult to get the heads brought forward, and by pulling the fore-feet forward, the heads are, for the most part, sure to be thrown back. Sometimes in old ewes, where the passage is large, and the pains regular and strong, the feet may be put a little back, so as to right the head parts, when the lambs will come forward without any other assistance.

In some cases, too, where only one foot presents with the head, the lamb, by drawing gently at that foot and the head, may be brought away without danger; but it is generally better to push the head back, and bring the other leg forward also in the right manner. In case the lamb comes backwards, discovering the tail, but no feet, the ewe should be held by the hind legs with the belly part upwards, which may be useful when assistance is necessary, as not only affording the most room for the hand, but as preventing the pains from forcing the lamb so much upon the strait and confined part of the passage; by which means the lamb can be more easily turned into any position that may be thought the most suitable and proper for bringing it forth. By giving the ewe such a situation, the state of the lamb will often be put right without any further trouble, as it naturally falls forward and the legs are thrown out backwards, so as to facilitate the delivery.

Where there are two lambs, it sometimes happens that the feet of one and the head of the other present themselves, which are sometimes mistaken as belonging to the same, a mistake that causes much impropriety, injury, and distress, and occasionally the loss of the

ewes, as well as the lambs, before it is discovered. This mistake may, however, be soon discovered by pulling at the feet, when a very great resistance will be felt; and then, if the ewe be held with the head to the ground, and the hind parts a little raised, an alteration will instantly take place, and that lamb which presented with the feet will be thrown back, while that with the head presentation will come forward, and the lambing will take place in a proper manner. In most cases where lambs come in a wrong position, and stand in need of being put right for lambing, the best practice is to take them away backwards, as in such cases only the two hind feet are to be got forward; whereas, when it is attempted to bring the lambs forth by the head and fore feet, the former is liable to turn back and cause much difficulty, while there is seldom any at all in bringing the lamb away backwards in consequence of its being so much smaller in the hind than in the fore parts. It is necessary, however, to remember, that when lambs present with the head and fore feet in the natural manner, it is the most useful and proper practice to draw in a downward direction towards the udder part of the ewe, while in lambing; but in cases where the lambing takes place in the backward manner, or by the hind parts, the lamb should be brought away in a straight line with the body of the ewe, or there will be great risk of destroying it, especially as it advances to the breast and head parts.

When, in lambing, injury is received by the ewes in such a manner as to render any thing necessary to be done to the parts, a little oil of turpentine and tincture of myrrh in mixture is the most proper to be applied; but they will be much less seldom wanted than is commonly supposed by those who have the care of sheep in those cases.

By using rams of the more improved kinds, with smaller and finer heads, in the breeding of lambs, as well as by letting the ewes be less full in condition at the time of lambing, and by their bowels being kept a little open by proper keep about the same time, they will in general lamb down with much greater ease and facility than when the contrary is the case.

In cases of breech presentations, the business of lambing in old ewes may sometimes be effected by turning; but in young ewes, and where the lambs are large, when the breech comes forward with the hind feet to the belly, and the ewe is lusty and narrow, there will commonly be much difficulty and danger in performing the business, and frequently it can only be effected by cutting the lamb away.

In cases where the ewes have dead or decayed lambs, it will be proper to draw them from them, or take them away piece-meal; and, if the ewes be extremely weak, caudle may be given to them, but in general they almost instantly perish. It is very seldom, indeed, that ewes recover in such cases; but good caudle affords them the only chance, and is the most proper nourishment that can be given to them till they are inclined to eat again.

AFTER-PAINS OR HEAVING.

This state of the animal is caused by the irritation and contraction of the uterus; as the same pains which nature uses to expel the lamb occasionally continue for some hours or even a day or two after it has been brought forth, and very commonly prove fatal to the ewes. Where the injury which the parts have received is great, inflammation and mortification is sometimes brought on sooner or later, according to the extent of the injury, the condition of the body, the nature of the keep, and the state of the weather. It is frequently seen

that ewes in this state, which have been kept alive a long time, from the wind being in the north, have perished the moment it changed to the southern points.

Ewes are often lost from removing them suddenly from poor to rich keep, as, though they may have lambed without any assistance, they are afterwards seized with heaving pains; a fact which sufficiently shews the impropriety of keeping ewes too full during their lambing. In all these cases much relief may be afforded by the use of a drink prepared as follows, and given as often as necessary:

Take of—Infusion of cascarilla, three ounces,
Tincture of opium, half a drachm,
——— castor, one drachm.

RETROVERSION OR FALLING DOWN OF THE UTERUS OR BAG, WHICH IS OFTEN TERMED THE ROSE.

It occasionally happens, after an ewe has had a difficult delivery, that the pains are so great as to force part of the uterus out through the orifice of the shape, so as to fall down; in this case it is necessary that the parts be returned as soon as possible, but which, if not properly confined by some means or other, are often protruded again almost instantly. There are different methods used in different places for the purpose of preventing the return of the mischief; and in some, a sort of hog-ring is put through the sides of the orifice or shape. This is, however, a barbarous sort of practice, and highly objectionable, as the ring is apt to rust. Some employ twine or small cord, while others use a piece of lead of the size of a crow quill, which they insert into each side of the orifice or shape part, after which they twist the lead, leaving only a very small aperture, which sometimes answers very well. A similar contrivance to that which is had recourse to for the same purpose in cows may probably be found the most safe and convenient; or a piece of fine tough brass or iron wire might be employed in some cases with better effect than the rings. But wherever it can be accomplished without any thing being put through the sides of the orifice, it will be most desirable. The ewe, after recovery, usually brings up her lamb without further inconvenience; and then she should be put out to fatten, that similar accidents may be thereby prevented.

In performing the operation of reducing the *procidentia uteri*, or falling down of the uterine bag, which, when much out of the orifice of the vagina, is very red and much inflamed, it will be necessary to use much caution in gently returning it in a gradual manner, and to have it well secured in some way, as directed above. Nothing further will then be required, as the parts, when clean, are much better without most of such applications as are usually had recourse to in such cases, inflammation being rather increased, than lessened or prevented, by such means.

The lambs in many cases may be restored, though they appear dead when dropped, by gently distending the lungs with fresh air thrown into them at the moment.

On dropping the lambs, the ewes should be suffered to lick them, and the lambs should suck; or, if too weak, should have ewes' or other milk given them, being always left close to, and in sight of, the ewes. When the lambs droop and hang their heads, it is a bad sign, as shewing much weakness and danger. Where ewes are to be catched in lambing, it is always to be done in the most gentle and delicate manner. The suckling or giving milk to all weak lambs is constantly to be well attended to. The twin ewes, after their lambs can walk, are to be removed to their proper pastures; and in some cases the single-lamb ewes are

put upon the summer grounds, where they are to be kept, which prevents the lambing pastures from being too much crowded.

SUBSTITUTE LAMB.

A twin lamb is sometimes given to an ewe which has lost her lamb; but, when weak, this is always hazardous and improper, and a dead-lamb ewe has often a strange lamb put upon her; but whatever device or deception may be made use of for the purpose, it seldom succeeds.

Some breeders, however, assert that the practice of taking off the skin of the ewe's own lamb and putting it upon the substitute, is often attended with success; but in doing it, the greatest care is to be taken that every part of the substitute lamb be wholly and completely, even in the most remote parts, covered. Such parts as cannot be covered, as the crown of the head, are advised to be rubbed over with the slime, cleaning, or some of the internal parts, in some cases, of the ewe's own dead lamb. The substitute should then be put to the ewe in a confined spot, and in the dark, as being the most likely to succeed by affording the least means of its being examined by the ewe. The live lamb's tail should be kept within the skin which is put on, as that is often much examined. The substitute lamb should be put to the ewe when hungry, and watched till it is suckled by the ewe, as by suckling there may be more attachment produced in the foster mother. The ewe and the lamb should then at first be kept together by themselves, as if suffered to go with the flock, the lamb may be liable to stray away and be separated from the ewe, which would cause more indifference. It is necessary in most cases to let the skin, or additional covering of the lamb, be kept on for some days; but, the shorter the time the better, as there may be injury done to the foster lamb by its remaining on too long, as it would heat it too much, and inconvenience it in other ways. It is not by any means easy to deceive ewes in respect to their lambs, but it may be occasionally successful in such ways as the above, and in some others.

Where the ewes do not readily take to such lambs as are put to them, there may be great harm done to both of them by attempting to force them in any manner. Therefore, in all such cases, when the ewes do not quickly form some sort of attachment for the lambs, the attempt should be given up, as no good can be done in any forcing method. For no effectual means of making ewes take to strange lambs have yet been found.

Great care is constantly necessary with respect to the twin, and all the other lambs, to see that they are well kept and regularly suckled by the ewes, and that every sort of accident be as much as possible guarded against. The udders of the ewes should always be well looked after, as they are often liable to disease.

In the lambing season, towards the end of the first week, one half of the ewes of a flock will generally have lambed, and probably more than two-thirds of them at the conclusion of the second; in which case the ewes may be drawn into a narrower compass, the lambing grounds be quite cleared of the twins, and of most of the single lambs, and those which are to be cut got ready, as that business is often well done at this time, and saves much future trouble.

In these ways, and by the use of proper shelter and warmth, a very great saving of lambs and ewes may be effected in lambing the ewe flocks, and the profits of the sheep-breeder be greatly increased.

SUPPORTING THE EWES AND LAMBS.

As soon as the lambing has been finished, the ewes with their lambs should be turned upon suitable portions of warm dry land, where the shelter is good and the state of the grass favourable; so that no material injury may be done to them, either from the severity of the season or the want of good keep; and where there is as little disturbance as possible, as their remaining quiet is of much consequence. By this necessary care and attention there will be a much less loss of lambs than would otherwise be the case. In addition to such pastures, at this period, it is likewise found to be very beneficial to have good supplies of some sorts of early green food of the turnip or artificial grass kind for turning the ewes and lambs upon, as there may be occasion; as the milk of the former is thereby much increased, and the growth of the latter greatly promoted, circumstances of very material consequence; as, when lambs are in any way stinted at this early stage, they never thrive or turn out so well afterwards. With this view, in some cases, they are first put on portions of rye grass, then on the cole or rape, from which they go to the rye, from that to the water meadows, if there be any, if not, to the new layers, being kept constantly in hurdles with full room to fall back. By these, or some other sorts of early green crops, and the pastures, they are to be supported from lambing time to that of their being weaned, in as full and good a manner as the nature of the keep in the particular situation will afford; always having regard to their thriving condition without bringing them too forward.

WEANING THE LAMBS.

This is a business which requires some attention, and which is in most cases best performed when they are getting from about three to four months old; but which takes place earlier or later according to circumstances. On some rich old pasture lands, and in other cases where the lambs may receive considerable improvement without the ewes getting any injury, and where the latter may be wished to be prevented from getting early into too much condition, they may be suffered to suck some time longer with benefit in different respects. But in most other cases the most favourable time of weaning them will be when they are about the above age. In order to effect the business in the best manner, the lambs with their mothers should be allowed to rest on the grounds which the former are to have for some days, when, in the evening of one of them, the ewes are to be quietly removed from them to some distant pasture or place where they are to be kept, but where they cannot be heard so as to disturb the lambs in their feeding. Where the lambs have continued so long as to be capable of eating grass, little check or inconvenience will be sustained by the separation, but in other cases they will be a little uneasy at first, but the uneasiness will soon disappear. The pasture, or ground into which the lambs are put, should be fresh, and of a good suitable bite, that they may proceed in their growth in a proper manner, without sustaining any check. For this purpose, the clover or sainfoin eddishes which are now mostly ready, will be very proper. In all cases, some provision of these sorts should be made, or the weaned lambs will soon decline; and whenever that is the case, they rarely recover, however good the keep may afterwards be. In some places, the lambs, after being weaned, are sent to other parts for a time, but this a bad practice. Some, and especially the sheep-masters in the north, think it greatly beneficial to return the lambs,

after some time, to the lands on which the ewes are kept, as it favours their natural habits.

Where the ewes that have had their lambs taken from them suffer any uneasiness from the over-distention caused by the milk in their udders, it should be drawn away once or twice in order to prevent any bad consequences. And in all cases where such ewes are to be disposed of the same season, they should be weaned sufficiently early for the purpose.

CASTRATING THE MALE LAMBS.

The most proper time for performing this operation is, probably, while the lambs are very young; about two or three days old, as their state of strength may be. It has often been done on the very day of their being lambed, when in a proper situation of health and strength, without the least inconvenience taking place.

In the execution of the business, it is the practice of some, to lay open the cod or scrotum in a slit manner, while others cut off the end of it; either of which may answer perfectly well, when made sufficiently large to permit any discharge that may be taking place to pass freely away; as by its retention inflammation and further mischief may ensue. The testes are then to be carefully sloughed or drawn out in a proper manner, when all that is necessary will have been performed, the lambs being restored to their mothers.

In doing this sort of business, the state of the weather should be well considered, as it is the best and most safely performed when it is not too moist, but somewhat cool: as there is then the least danger of the lambs bleeding too freely, or that too much inflammation and gangrene will take place.

Where there is too much bleeding after such operations, some persons imagine it may be restrained by tying a ligature tightly round the tail, or cutting the tail off; but there does not seem to be any power in stopping such bleedings by either of these means; a better method would probably be, in such cases, to apply to the parts large dossils or pledgets of some linty or towy material, well moistened with the compound tincture of benzoin, or some solution of a more strongly styptic kind, which could not fail to have a more ready and certain effect in such cases.

It is usual, where the stocks are large, to cut and castrate the lambs in this manner once a week or fortnight, during the whole of the time of lambing, which may be a good method in many circumstances and situations.

CULLING THE EWE STOCK.

In the regulating of the breeding flocks, it is the usual practice, whenever improvement is aimed at, to remove a number of the old ewes, or crones, in proportion to the extent of the flocks, every year at this time, supplying their places by the best and most perfect ewe lambs. The proportion in which it is done should always be such as to leave no very faulty or improper ewes in the flock; every old, toothless, and very ill-formed and bad-woolled, ewe, being constantly taken away, so as to keep up the stock in the most perfect state possible. As this is a point of very material importance in many cases, the more correctly it is performed, the greater will be the advantages of the store-master. It should, of course, be a matter of close examination, and not be passed over in a slight careless manner, as is too commonly the case. The ewes should undergo the careful inspection of such persons as are well acquainted with the principles of sheep-breeding, in order that they may be draped or culled in the most useful and advantageous method for

the amendment of the flock, whatever its nature may be. All the more aged, barren ewes, should now, likewise, be removed, and their places supplied in the same manner. All such refuse ewes being disposed of, as circumstances may direct, in the particular situation or place. The more fully the business of culling is effected, the better the stock will be.

SETTING THE LAMB STOCK.

This is a practice which is of great utility, and that prevails in most of the sheep districts in the southern parts of the country; but which is not sufficiently attended to in many others. It is, however, highly necessary and beneficial in all, and consists in selecting and picking out all those which are the best, and rejecting those which are improper, or not wanted to be kept in the flocks; and in choosing those ewe lambs which are to fill up and supply the deficiencies in them, caused by the removal or culling of the ewes in the breeding stocks. It usually takes place about the period of the great lamb and sheep fairs, that is, towards the close of the summer, when the whole are collected and brought together into different lots for the purpose of drawing from. In the execution of this business, considerable care and attention are requisite in the persons who perform it, as its usefulness depends much on the correctness of the knowledge which they have on the subject. The great rule or principle which regulates the matter, in many cases, is, properly to reject all such, whatever the breed may be, as deviate in any way from the proper signs of the true sort. The form should, however, at the same time, be well regarded, but which is rarely looked to: thus, in some flocks, a white leg, and a face not properly dark, would form an exclusion, however good the form; in others a white face; in still others, a black face, or a horn that does not incline backwards; and in some a horn that does not project, would prove causes of rejection; and the same in some other cases of such stock. There may be some reason and propriety in this, especially when the produce is yearly disposed of in the lean state; as those who have been accustomed to certain sorts, which have answered well, prefer them, and are desirous of getting the same kind again. Some persons, however, in this business of selection or setting the lambs, look chiefly to size, constantly reserving those with the largest frames; and this is, probably, in some measure right, since late trials seem to show, that sheep do not eat in exact proportion to their size or weight; consequently, the largest of any sort that can be well kept on any particular kind of land, where the forms are equally good, seem to be the most proper. The safe rule, in all cases, however, is, to choose well-formed lambs, or such as have the indication of making well-formed ewes, and to let them have good size if possible. In what regards wool, in setting the lamb stock, in those of the fine carding sort, where the annual price is fixed, and the same for all, there is no inducement to the lessening the quantity for the sake of the quality; but as both are attainable, and capable of being united, that circumstance should be well attended to. In the long-woolled or combing sort, as price is of more consequence, from its being so various, quality is of very little account indeed, compared with quantity. By marking every year a few of the best ewe lambs, to be put to some superior ram, much gradual improvement in the flocks may be produced.

It is necessary to reject the ill-formed and bad-conditioned lambs that may shew them-

selves; such being always improper to be continued in the flocks.

It is necessary at this period, too, besides filling up the vacancies in the ewe-stock, to increase or diminish the quantity to be kept, by rearing a larger or smaller number than that of the old sheep which have been disposed of. This is a matter which demands attention in different respects. In some cases the number varies little in consequence of the particular nature of the sheep pasture, while in others, as where green food is cultivated for the support of sheep in combination with grass, it varies greatly according to the quantity, the nature of the stocking, and the views of profit; but under good management, the increase will be considerable, as the advantages in this case are very great.

REFUSE AND OTHER LAMBS.

As soon as the setting of the lamb stock has been properly completed, it is the custom in most places to send the ewe and wether lambs which have been left in such cases to the proper lamb fairs in the vicinity, where there is the best opportunity of disposing of them. But in places where such fairs do not happen sufficiently early for the purpose, they must be kept some time longer, and should have good forcing food, such as spring tares, early sown rape, and natural grass pastures in the proper state, in order that their growth may be increased as much as possible. It is, however, always the most advantageous to get them off early.

Section VI.—*Rearing and supporting Lamb and Sheep Stock.*

The young lamb stock which has been weaned and reserved for keeping up the flocks is now to be put upon proper pastures, for the purpose of being well carried forward in their growth. The pastures should be as fresh as possible, and of the rather short and close kinds; and if, when they begin to decline, proper supplies of suitable sorts of root and cultivated green food can be had, they may be reared in the most favourable way, and in the largest proportion on the same extent of land. With this view, the early fed grounds, the new lays, the turnip, the tare, and the rape crops may be the most suitable, carrying them on to a state of much greater perfection than could otherwise be the case, to the great advantage of the breeder. It is not improbable, indeed, but that the lambs under this mode of keep at a year and a half old would be equal to those which have had half or a whole year more length of time for their growth, under other usual sorts of management, which is a saving well worth attending to in rearing young sheep stock. The practice has, however, been yet too little attended to, though it is daily gaining ground in many large sheep districts; and it may perhaps admit of much farther improvement, so as to render the rearing not only less difficult, but more profitable.

CULTIVATED ROOT AND GREEN CROPS FOR SHEEP.

The cultivation and raising of such crops in connexion with this sort of stock is not, however, only necessary in the rearing of the lambs, but likewise in the keeping of the store sheep, as without such crops this cannot be done in the most beneficial and efficient manner in many situations. The crops and other sorts of food, which may be advantageously employed in this way, are of several different kinds, as they relate to the times and seasons in which they are used.

SUMMER SHEEP FOOD.

In supporting and keeping flocks of sheep in the summer season, the usual food is that of the pastures, whether of the more rich or inferior kinds; but in some cases, where they are of the close, short, and scanty down sort, rape or cole, tares, and some artificial grass crops are grown for them, and are considered by many to be of great use in raising and preserving such stock. Others, however, in such situations, depend wholly on such pasture produce, as being a sweet aromatic herbage best suited to the purpose, when sufficient for the sheep filling themselves well on before they are confined for the night. It gives fineness of flavour to mutton, firmness to the flesh, and excellence to the wool. All sorts of rich juicy food are supposed to be prejudicial to the wool, rendering it coarse, but increasing the quantity, in proportion to the injury sustained in the quality, as is seen in many such cases. But though the different sorts of artificial food that have been just noticed, may not be so advantageous in regard to wool in the finer fleeced breeds of sheep, as such fine pasture keep, they may often be used with great convenience, and without injuring the wool by proper care and management, in supporting them, where the summer keep of such pastures is too scanty, as the actual practice in some such cases has fully proved. In all such states of the natural keep, having such cultivated crops in readiness for the sheep, must, consequently, be of much importance, preventing their decline and stoppage of growth; and must, therefore, be well worth the attention of flock-masters in such situations.

WINTER SHEEP FOOD.

This principally consists of turnips, potatoes, hay, cut straw, plants of the cabbage tribe, and some other similar kinds, with the natural pastures. The turnip crops, in their different kinds and states, as a lasting and holding out sheep food at this season, are certainly excellent and of very great value, especially when given in a limited manner, and suitably combined with some sort of dry food, so as to correct their watery effects, which neither drawing and stacking, as practised in some districts, or any such methods, effectually prevent. They are given differently in different circumstances and places; but where the whole of such crops are eaten by the store-sheep, and the land is sufficiently dry for them, the best method is by hurdles on the ground, as most beneficial to the sheep, and at the same time affording the most improvement to the soil. If the crops are partly consumed by the fattening sheep, the rest may be very advantageously eaten by the store sheep, as in that way there will be the least possible waste. Where the land is not sufficiently dry to allow the sheep to be put upon it, the usual practice is, that of drawing them and taking them to some sound, firm, old neighbouring pasture, where the store, ewe, or other stock, may have them once or twice in the day, as there may be a necessity, taking care that they be constantly eaten clean up, as that will prevent waste, and serve as a guide for the quantity that may be daily wanted. In this manner the food will be eaten without much waste or loss, but the practice is very inferior to that of eating them off on the land. By means of these crops which come in at different times, the Swedish and stubble, the last, with proper supplies of dry meat, the lamb and ewe stock may be well supported through the winter season, and be brought on in the best state of condition until the turnips be wholly finished in the beginning of the spring, after which such crops would injure the land.

But other roots, as the potato, come in to assist these in some districts, where they are useful in lessening the expense in some measure, while they are not less beneficial in keeping up the condition of the store flocks; and though their use in this way is not so well known, or so thoroughly ascertained as that of the turnip, the trials that have been made with them shew that they greatly deserve the attention of the flock-master. They are also a regular steady crop that is liable to few accidents, while the turnip is exposed to many; and during a severe season, the use of such a root must be of much importance. They are given to the ewes and other sheep in the proportion of about a quart in the day to each, as lean sheep do not require any large quantity for their support. They are conveniently given in cribs or troughs in the sliced state, and the ox-noble potato is perhaps the best for the purpose.

Another substance which is frequently given as a winter food for store sheep, is hay, which is almost constantly used in connexion with these roots, as well as sometimes alone, being in most cases highly serviceable to such sheep. Hay, by its drying and other favourable qualities, improves the food from these roots, and, consequently, a small portion of it given daily with them is an excellent custom, let the state of the season be what it may. In wet bad seasons, or when there is much snow upon the ground, it is of very great use when given to the lambs and ewes or other sheep alone, in small portions; and the best method of giving it is in the cut state, in troughs made for the purpose, as there is in that way the least waste. The method, by moveable racks, however, prevents the trouble and expense of cutting the hay, which is some saving, but it probably does not in that manner go so far. The littering practice of letting sheep to hay-stacks is never to be much employed, though it may have some use in the way of shelter. The softer sorts of hay, as that of the rouen kind, is the best for sheep, whether used alone or with roots of the above kinds. Sainfoin hay, too, is much valued for this purpose. Cut straw, pease haulm, or other such cheap matters, are also very beneficial when given to store sheep, with such roots, and some other kinds of juicy food, in a suitably small quantity at a time, as they promote the thriving of the sheep in a very favourable manner.

Plants of the cabbage kind have been very successfully made use of as a late winter food for store sheep in many places, and the advantage has been very great whenever the soil has been proper for them, in supporting a greatly increased quantity of such stock, as the produce is very great in proportion to the ground on which they are raised. By different sorts of plants of this nature, which properly stand the season, when well attended to, the sheep may be carried on in a proper state of condition, from the time the other sorts of winter food begin to fail into the early spring, when other crops become in readiness. For store sheep, these plants are probably used to the best advantage, when taken off the land and given to them in some proper convenient situation.

In all cases, the sheep under such sorts of keep, have still the natural pastures to feed upon when it may be proper.

SPRING SHEEP FOOD.

Many different crops come forward at this season for the purpose of keeping sheep, when properly attended to in their cultivation and

growth, as rye-grass, red clover, tares, rye, cole, or rape, preserved after-grass, winter-barley, and some others.

The first is very material as a store sheep food, as coming in so early as immediately to succeed the common turnip in the beginning of spring, when so much wanted; and it is capable of being raised to advantage on land where clover will not grow; but it has the disadvantage of requiring a large space of ground, where many sheep are to be kept. It is, however, well worth attending to in this view, wherever sheep are extensively kept, and other similar food scarce.

The red clover crops come into use in this way at a rather later period, and are raised to the most perfection and benefit on the heavier sorts of land where they are sufficiently dry. They are very productive in many cases, and extremely well suited to the raising and supporting young sheep stock.

Tares, on the more strong soils, are greatly in demand as a sheep food in many places at this early season, and are found to be very useful, but they require some attention in eating them off to advantage, and to prevent waste. The proper culture of the winter and spring tare, with this view, for spring and autumn use, after clean grain and turnip crops, is highly important. Rye is a crop which comes in soon, and may be grown well on a lighter soil, but which does not go far in keeping sheep at this season, though very useful in bringing them forward in a proper state of condition; it cannot, of course, be so fully depended upon as some others, yet it gives much assistance to the store master in many places.

These several crops, as sheep feed, are found to answer far better when used alone, than in mixture, as is too often the case, as the two latter sorts never come well together, and the two former are different in their earliness, by which, in both cases, there is much loss and inconvenience.

Cole or rape may be well grown on many sorts of land, even on those of the thin hilly kinds, where such crops afford an excellent sheep food for this season.

There are still, probably, many other plants and grasses of these and some of the natural kinds, that are capable of being cultivated and raised with much benefit with this intention, so as to afford the means of vast improvement in the keeping of such stock, being possessed of excellent qualities for that purpose, such as earliness, quantity, and suitable properties for different soils; but trials with them have not yet gone far enough fully to determine their advantages.

In cases where the tops of such kinds of crops as succeed well in following those of other sorts can be used for sheep feed at this season, those of the stubble turnip kind may often be found of much service.

The young early wheat crops can rarely, if ever, be relied upon as a sheep food at this period; but winter barley has been tried with success, in so far as the trials have yet gone, and from its hardy nature, earliness, and large produce, it seems to promise well.

The practice of preserving after-grass or rouen for sheep-feed in the early spring, is often of very great use in the support of the lamb and ewe stock at that period. Where the land is dry, it is occasionally of vast importance in this way, as presenting a fine spring of young grass, below the covering of the old for the sheep to feed upon, which as they eat a little of both is commonly very beneficial to them, besides being less expensive than most other modes of keeping them at this season. Such a reserve of sheep food, for this difficult

season, should, therefore, never be neglected where large flocks are kept, where there is an opportunity of obtaining it.

Keep of any of these sorts should constantly be provided in full proportion to the sheep flocks to be kept, though the most proper modes and quantities of giving it be not yet well determined. The quantity which is given at once, should, however, be rather small than large.

By means of raising such crops as these or others, which may be proper as sheep food, with the view of rearing and supporting the flocks in such pinching seasons, many beneficial results may be the consequence; many more sheep may be raised and kept on the same space of land; they may be preserved in a far more thriving condition, and be in much more suitable states for breeding, fattening, or continuing in the rearing growth, and, of course, be in every way more beneficial for the purposes of the store-master; while, at the same time, the culture and growth of such crops afford a cheap and excellent preparation for corn. What has been already done in this way in some districts where there are but small extents of proper pasture lands, sufficiently shows what is capable of being effected under the proper management and regulation of such crops.

SECTION VII.—*Practices in keeping and managing Sheep-stock, in different Circumstances and Situations.*

THERE are different practices in the treatment of sheep according to the nature and peculiarities of the lands on which they are kept, the sorts of farming which are carried on, and the particular situations and states of the grounds, as whether they be small or large, enclosed, or in the open state, low pastures, high heaths, downs, and commons, or hills and mountains. But whatever these may be, the sheep should always be arranged and divided on them in such a manner as is most suitable to their natural habits and dispositions, as well as to the particular intentions for which they are designed, as by such means they will be kept in the most proper states for the profits of the store-master. Where sheep are in a state of perpetual motion and change, as in general is too much the case, they never answer so well, either in the view of breeding, rearing, or fattening, as where they are kept more at rest. Domestic sheep, and especially the improved sorts, are naturally tame and quiet, and the more they are preserved in such states, the better they succeed in every way. It is, therefore, a material object with the flock-master to have the sheep on his lands so arranged, as that they may be as little as possible moved backwards and forwards. The too common practice of keeping the whole of the flocks in one parcel, on some pasture or place for a while, and then moving them to some other is very improper, as the sheep are never left sufficiently at ease in such management. Even when left to themselves, sheep will form, in some measure, into collected bodies, which feed on separate and distinct parts, with little removal. And when first turned upon a pasture, they cannot be easy until they have gone round it, and found a proper resting place or places, when they begin to feed. Consequently, the more the breeding, the rearing, and the fattening sheep are kept to the same pastures, the less they will be disturbed, and the better they will thrive by fattening, provided the keep be suitable.

IN PASTURES AND ENCLOSED LANDS.

In turning sheep upon lands of the enclosed pasture kinds, they are best separated into rather small parcels, in proportion as they may be of the breeding, rearing, or fattening sorts, and as the grounds may have suitable divisions for the purpose, as they are constantly found to do much better than in large lots; for they pasture and feed more quietly, probably eat less, and make less waste in their trampling and resting places. Each division of pasture should, however, have the full quantity it can properly support, being careful of overstocking though hard or close stocking may be beneficial in many cases. The nature of the pastures on which the different sorts are put, must vary according to circumstances; but the breeding and rearing lots should have mostly those which are less rich, while those which are fattening, should have the best; each division should, however, always be as well supplied with keep as circumstances will allow. It is well known, that sheep which have been bred upon the land, are the most healthy, and do the best, probably in consequence of being less disturbed; and that sheep of all sorts are rendered uneasy when put upon new pastures, and decline much in their condition, requiring a length of time to bring it up again, which would seem to show that they should be kept as much as possible upon the pastures to which they have been accustomed. The practice in some of the best sheep pasture districts is strongly in favour of this system; as in the marshes of Lincolnshire, where it is customary to put only as many sheep upon a pasture as it will properly keep, and where the whole generally become ready for being got off early in the following spring; whereas, if they were put in large lots in extensive pastures, amounting to the same breadth, probably very few would be in that state. It has long been known that grass lands, which are distributed under small divisions, will in general keep and fatten more sheep or other stock in proportion, than where they are in large extents. The practice of keeping sheep on enclosed pastures in large lots or parcels together, and frequently moving them about, in whatever manner it may be done, being contrary to their habits, is, therefore, improper and disadvantageous; and the better method probably would be to dispose them over the pastures, in separate, not too large lots, so as that they may not be too much changed about in their feeding them down.

PARTICULAR PRACTICES.

Various local practices in the management of sheep flocks prevail in different places, but the following are the principal.

In the above-named extensive sheep-district, the lambs which are mostly raised by hired rams, are in the wether sort commonly sold by the breeders in the beginning of the autumn, at fairs held for the purpose in the neighbourhood; these are re-sold in the spring at other fairs, under the name of hogs; they are clipped in the summer, and then wintered by those who have them; when in the succeeding spring they are taken to other markets, and at length disposed of to the feeders in their wool, in the state of shearlings, who directly put them upon the marsh pastures to fatten, their fleeces being taken. When wintered, the best of them are got into the fat state in the ensuing spring; whilst those that do not fatten so readily, afford a fleece in the summer. Thus, a connected practice of sheep management is kept up, as they are constantly either changing hands or affording fleeces, by

which a return of some kind or other is made to their owners, nearly every half year, from the time they are lambed to that of their being killed. The breeding ewes, and the other part of the lambs, in some measure, stock the different kinds of land, others being bought in at one and two years old for the purpose. A proper stock is thus regularly kept up upon the pastures, and being divided in lots not too large, they are readily brought forward into a proper state for disposing of to the best advantage.

But in the rich marsh pasture districts in the southern parts of the kingdom, the usual practice with the lambs is that of sending them in lots in the autumn, after being reared, to be kept through the winter on the neighbouring uplands in the stubbles and pastures; where if they were more divided and put in separate parcels in the several fields, and supplied properly with other sorts of food, at particular times, the practice would be greatly beneficial; but these points are little attended to. In this way, indeed, with care, they might probably be safely kept at home in dry warm situations, with much advantage. They should never be stocked along with the old sheep, as they will constantly take the feed, and *stench* or injure the ground, which may much hurt the lambs; it is, of course, better to separate them. This practice with the lambs is expensive, and the loss occasionally considerable, and, therefore, to be avoided as much as possible.

The one year old lambs, in this management, are brought in the early spring, as the beginning of April, from the uplands, often in a low condition, for breeding or feeding stock on the marsh lands, by which management more ewes and fattening sheep may be kept on them; as when they arrive they are put upon the most inferior pastures, at the rate of five to the acre, the old sheep having been got off to make room for them. Lately, however, the practice of prevailing upon the upland lamb keepers to provide for such stocks for some time longer, as a fortnight or a month, and to let them have turnips for that time, has been common, and by this means the stock may be doubled on the same marsh pastures during the summer. Such pastures are gradually eased, however, as the fat ewes or wethers are got off, and their places are supplied by the wether tegs or yearlings, the ewe tegs or young ewes being continued on their first pastures until they are selected for breeding from.

In the ewe-stock management, in those marshes, the practice is to have the ewe tegs, the one lamb, two lamb, and three lamb ewes all mixed together; so that they cannot be known or distinguished until they are culled, draped, and marked off for fattening, which is very improper. A better and more convenient arrangement would, perhaps, be to have the different kinds kept in separate parcels as much as possible, which would have several advantages. In winter they are turned upon the land, in the proportion of two or three to the acre, according to the goodness of the pasture, and in the summer, in that of three or four, and their lambs; but where there are twin lambs, never more than three; on the best pastures, allowances should, however, be made for the differences of season, though that is too seldom attended to. It is suggested as proper, where there is the prospect of plenty of keep to increase the number of ewes on the breeding pastures, though there should be a necessity, on that account, of providing additional pastures; many are, however, so attached to the common practice, that the necessary increase of stock for keeping the pastures properly eaten down, is not provided,

by which neglect they are much injured, and great loss is sustained. The old ewe sheep, or those which have had three lambs, are mostly turned off for fattening, and the others marked as stores, their lambs being weaned from them, by turning the ewes upon one of the pasture fields for some days, which is advantageous to the land and to the ewes. But some dislike this practice, and turn their ewes directly upon the feeding grounds, being convinced that more injury is likely to arise from keeping them in a starved state, for even a short time, than by throwing them at once on fresh keep. The former is, however, the most usual practice. The ewes, for breeding ram lambs from, are selected about the weaning time, just before putting the ram to them.

The practice in these marshes, for the wethers, and the times of drawing them for the market, are as follows: the wether tegs, or young wethers, are mostly put upon the feeding land for the winter, in the beginning of the autumn, in the proportion of from two to three on the acre, according to circumstances. Where they are to be kept a whole year, the number is mostly three on the best pastures for that time; but where a second or a third return is to be made, it is not in common more than two, in which cases, however, it is necessary, that they be turned upon the land more early, that they may become properly fat before the winter sets in, and go off sufficiently early. This latter practice is considered as unquestionably the most profitable; but where the supply of summer pasture is not sufficient, it may probably pay better to keep three to the acre, in a barely thriving state, and to feed or fatten them perfectly in the succeeding spring and summer. It must, however, in general, be a losing practice, as in most cases, the sooner they are disposed of, the more profit there will be, whatever may be their increase by the length of time they are kept. It is not fully decided whether other sheep, or the old barren sort fatten the most readily, but it is supposed, that any increase in the food of full-grown sheep must have a tendency to the production of fat, while in wethers or other young sheep, it must be partly expended in the developement of the several parts of their frames, and, consequently, less fat be formed. The nature, disposition, and size of the sheep, ought always to be taken into consideration.

The time and manner of drawing the sheep for market are very different in the practice of different persons, much earlier with some than others, though the sheep were all put on the fattening pastures at the same time. Some breeders draw the worst of the sheep first, on the idea, that the prime sheep pay the best for keeping; while others send them as they get ready, by which means, time is given for the advancement of the more common ones. Which practice is preferable is not decided; but the sending of inferior mutton to market, it is supposed, is only giving it away; while, on the contrary, the retaining of such sheep as are deficient in disposition to fatten, is a complete loss of the keep of them. However, as the keeping them a little on towards the end of summer is often not an object, from its little value, it may, perhaps, be the best method not to part with them until the approach of autumn, when inferior mutton often sells well. A better selection of the sheep would, however, in a great degree, prevent all this mischief.

In sending the sheep to market, some graziers divide them into two or three lots, while others send them all in one; but as having the

parcel as nearly as possible, all the same in size and fatness, is material to their sale, it seems best to put them in suitable lots, as in that way they usually bring the highest prices.

ON DOWNS, HEATHS, AND COMMONS.

In these situations there are some differences in the practices with respect to sheep, from those that are pursued on the enclosed pasture lands, though the management in the breeding and raising of them is in almost every respect the same among the best flock-masters. The most material points of difference are in the modes of stocking and distributing the sheep in such situations. The most common practice has been to turn them upon the lands in large flocks of all sorts together; but it would probably be better to have them divided into separate kinds, and put in smaller divisions upon such grounds. They would certainly feed more beneficially, but the trouble in managing them would perhaps be a little increased. This practice has begun to take place in some such sheep districts in the more northern parts of the kingdom, and much advantage has resulted from it to the sheep flocks. The usual management is either to keep the sheep wholly upon such grounds, or to turn them upon them as early as possible in the spring season, after they have been in other places for the winter; keeping them upon them until the autumn has commenced, or as long as there is sufficient of the fine sort of herbage for preserving them in tolerably good condition, when they are brought into the enclosed grounds for the purpose of breeding and other intentions. In either case, in some places, when the sheep begin to decline in goodness and become scanty in the keep, it is now the practice to make use of other sorts of food, which have been cultivated or provided for the purpose, such as turnips, cole, and different other crops, according to circumstances. They are folded on this food through the autumn and winter, as well as early spring, in some cases, if it will last out, if not, they are fed with hay whenever such crops are finished; and sometimes a little with them, which in some places is stacked for the purpose, until the grass has arisen to a proper state of growth. In many such cases, the practice of folding is in general had recourse to the whole year round, in the summer and autumn for the most part on the ground in the course of preparation for wheat, and in the winter frequently on the stubbles, but more extensively on the downs and pasture lands; while in the spring, the fields that are getting into readiness for the barley crops receive them. In this way the practice of folding is found beneficial in such situations, though unfriendly to the habits of sheep. There are still some cases of this kind in which little of these sorts of food is ever provided, but such management is always very injurious to the flocks. The practice in such situations, in many cases, is to sell the wether and refuse ewe lambs which are not wanted as soon as possible to the feeders; and constantly to get rid of a certain proportion of the old ewes yearly, such as those which have had three lambs, and are from four to five years old; as it is considered very bad management to keep them until they are broken mouthed, as is done in many sheep districts. The breeding flocks are left a month or longer at lambing time without being folded. The young ewes are put together and flocked or folded at night until they are a year and a half old, when they are mixed with the breeding stock.

UPON HILLS AND MOUNTAINS.

On the less elevated hill districts in the northern parts of the kingdom, the larger flock-masters in most cases have their sheep divided into two flocks, one of which consists of the breeding ewes, and the other of the *eild* sheep; and sometimes the hogs or lamb sheep of one year old are separated and formed into a third flock. The usual practice with the ewe flock, is that of folding it upon the broken arable land as near the hill pasture as possible in the summer; the wether lambs are cut in the latter end of May, and all the lambs weaned in the beginning of July, when the whole of the flock is shorn. After weaning, the lambs are sent to a healthy sound high pasture, which has been kept fresh for them, where they continue to the end of the summer, when they are brought down to the best low pasture, which has been saved for them from the time of weaning, where they remain through the winter. In cases where milking is practised, which are now rare, the ewes are milked for about eight weeks after the lambs have been weaned, or sometimes longer, when they are put out on the same pasture with the lambs for the winter. All the sheep are smeared or salved as soon as possible after harvest, at the expense of about sixpence each. The wool is worth about eight pence or ten pence a head, beside the salving. The ewes on the dry healthy grounds are drafted and sold to the graziers in the beginning of the spring; but when on wet lands subject to rot, they are drafted and sold off in the early autumn. Such storemasters as do not breed sheep enough to keep up their stocks, have to buy in yearly lots of hog sheep, mostly wethers, which they keep for two years, and then sell them to the feeders.

In other parts, the flocks are divided, in the summer, into three divisions, or *hirsels;* in the first of which are all the hog and *eild* sheep; in the second, the milk ewes; and in the third, the lambs; but in the winter, they are kept only in two, one of which contains the hogs, and the other the ewes and *eild* sheep. The lambs are weaned a little after the middle of the summer, the ewes milked for about six weeks afterwards, and the milk made into cheese. The sheep are shorn about the end of June, and the ewes have the tup in November. The breeding stock is changed every five years, by selling off the old ewes nearly at that time, as they may decline.

In other situations, again, they do not overstock, but keep as well as possible on such lands, reserving the best ewe and ram lambs for breeding, converting the worst to the purposes of fattening. They change the rams frequently, and the breeding ewes occasionally. They put the best tups to the best ewes, and do not let the ewes breed before a year and a half old. The rams are disposed of at three and four years old, and the breeding ewes at about five or six. They do not let the lambs come too early in the spring, and wean them about the middle of June, having good grass prepared for them; and if possible, they keep them separate, and in the best keeping pastures through the winter. Some, where it can be done, keep not only their hog lambs, but their wethers and ewes, as well as the lambs in separate lots, by which means they can be better attended to, each may have the pasture that is most suitable to it, and the whole go on in the best manner.

In the more elevated and exposed mountainous sheep tracts, in such northern parts, the practices with sheep are still different, and in many cases not so beneficial. They are there often left to themselves in the most trying

circumstances, when the grounds are covered with snow, depending almost entirely on their own habits in removing it by their feet to get at the heathy withered herbage below. As they are constantly kept on such situations, it becomes frequently necessary to keep them incessantly moving about round the top of some hill, lest they should get lower and be drifted by snow storms, as they fall in the winter season. Many practices are used for removing the snow, but without much effect; and some give the sheep hay in baits upon the snow, which is probably the best method, as in all cases some such food should be provided in order to get them well through the winter storms. There are several different practices in laying the sheep upon these grounds, such as having the lamb hogs and the old sheep in separate divisions on certain parts of them, through the whole of the winter, and until they are shorn, and then mixing them as before with the old sheep; and by having them put on the land in other proportions, before blending them with the old sheep flocks. As the chief object on these lands is the breeding and raising of young sheep, all that are not wanted are regularly sent to other situations to be made fat, and the breeding stocks from the great extent of the walks are usually large.

But whatever may be the differences of the practices in different situations and places with sheep flocks, the great object in all cases is to have them so divided and distributed, as to their kinds and numbers, that they may be improved and preserved in the most favourable states possible at all periods and in all circumstances, as it is only by this management they can afford the proper advantages to the stock-master.

In stocks of the breeding kind, the proper management must be pointed out by the nature of particular circumstances and situations, and by the means which are afforded. Whether to sell the lambs for being kept in other places, to suckle them for house lamb, to fatten them in the pastures for grass lamb, or to keep them on to be grazed and sold as store sheep or fat wethers; or whether the ewes which are not wanted should be sold in the lean state, or fattened, most advantageously in such particular situations. A practice which is useful in such cases and often beneficial, but which requires large capital, and much knowledge, experience, and attentive consideration, is that of raising and fattening off all lambs, both the wether and ewe kinds, especially where the markets or places for their sale are near and in other respects conveniently situated. This practice has the advantage, that when too expensive in the whole, it is capable of being partially acted upon; so as that whenever store stock is getting extravagantly high, to sell. But the practice, in such cases, which is attended with the least trouble and risk, is that of purchasing store flocks, as lambs, wethers, and crones, or old ewes; some of the last sort often proving with lamb, may be fattened off with them to good account. It is not unusual, in such cases, that some of the ewes are disposed of in lamb, or with lambs at their sides, in what are termed couples; in which circumstances it is often a good method to make annual purchases of them, in the view of fattening both, and disposing of them in that state within the year, which, in many cases, affords much advantage. These sorts of stocks, under such practices, can only be kept on and conducted with advantage in situations and circumstances where the extents of land are considerable, and of the mixed breeding and feeding kinds.

Section VIII.—*Confining Sheep in Folds, in the view of manuring Land.*

This is a practice, which, in whatever circumstances it originated, seems to be incompatible with the natural habits and dispositions of sheep. It was at a former period considered as almost absolutely necessary to the land, but lately such a notion has in most places been given up, and it is now generally believed, that, except in particular situations, such as those near large downs, heaths, and commons, or where grass pasturage is extensive, it is only bettering one piece of ground to the injury of another. It is at present objected to in enclosed lands, as wholly unnecessary and disadvantageous; as more sheep can be kept without than with it, that the loss is great in the injury done to the sheep, especially ewes and lambs, that it tends to keep too many sheep in one lot, that it does not leave the sheep sufficiently to their own habits of feeding and resting, that it causes much waste in the trampling, and that the tillage crops produced by it are much inferior to those raised in other ways.

There can be no doubt but that the practice is improper in all cases where the open state of the grounds do not render it necessary for keeping the sheep together, as folding requires a much greater breadth than when the flocks are divided in smaller lots in the pasture method, and the benefit to the land is probably not less; for where sheep are not folded, but left on the same ground night and day, they are found to improve it much more than when driven to other places to be folded. This superiority has been noticed almost to an inch, in feeding off new seed layers in some places.

Where the grounds are suitably arranged and divided for distributing the stock as there may be occasion, it has been found that one fourth more at least may be kept than where the whole is in one flock, and the food in some degree spoiled by driving to fold. There is now no question but that folded sheep demand more keep than those which are not folded. Consequently, by properly dividing sheep flocks without the use of the fold, far more sheep may be supported on the same land.

That this practice lessens the value of sheep can scarcely be disputed, as it has a constant tendency to reduce their condition. It is found to have this effect on old sheep as well as lambs, as the latter do not bring such high prices when folded as when they are not folded, and the former are in doubly better condition when resting still and quiet than when harassed by folding. The flock in most cases suffers considerably more than is gained by the use of the folding; for while one shilling is got by it, two are lost in flesh. The old sheep are often greatly hurried and inconvenienced by it; while in their more early growth the lambs and younger sheep suffer much from the drivings, get trodden down, and are far more retarded in their thriving than would be the case if they rested in a quiet state. It must, therefore, not only injure the breeding flocks, but the others, in many instances; causing much exhaustion and loss, as well as rendering the fleece lighter but not finer.

That in this practice there is a necessary tendency to the keeping of too many sheep in one division, it is impossible to doubt, or the full effect intended would not be accomplished. But by crowding sheep together in too large quantities, it is well known they sustain much injury in different ways; from which it is sufficiently plain that it is a sort of management that is quite inconsistent with the natural inclinations and economy of sheep, and which

should never be pursued by the attentive sheep-master where it can be avoided.

In folding, the frequent drivings that are practised in putting the sheep upon the lands are often productive of much waste of food in the trampling, which is the consequence, as well as in the injury which it does to the animals; in both of which ways it must of course be a very improper and disadvantageous practice.

That the crops produced by it are much less abundant than those raised in other ways has been found to be actually the case in many folding districts; which, whether it may arise from the dung dropped by lean sheep, being but in small quantity and less rich in quality, or in consequence of the great dissipation of the more fluid parts in the process by the heat of the season when it chiefly takes place, and the rest being thereby left in too concentrated a state for promoting the healthy growth of the crops, is a great and very material objection to the practice. For, if it afford little benefit in the chief intent of it, the raising of crops, it must be doubly disadvantageous, as both the land and the sheep must suffer by it.

But, besides the practice of folding being injurious in these ways, it is not less so in the tendency which it has to deprive other lands of their fertility; as the food which is to afford the dung to be carried to the fold must of necessity be collected from some other quarter, and be thereby greatly deteriorating to it, especially where there is not a large extent of some sort of open pasture land for the sheep feeding upon. The waste of dung by being dropped in so much driving, in different places, must also be considerable, as well as the trouble and cost of the hurdles, and of conducting the business, to which may be added the unproductive and exposed state of the land folded upon during the hot season, and the great reduction in the number of the sheep, which might otherwise be kept. It would seem, on the whole, to be a practice which tends to make the sheep a working animal instead of a quiet feeding one, which is its natural state.

This sort of sheep management has been defended, chiefly on the principle of its necessity, and the circumstance that in other practices the dung is not regularly deposited, in consequence of the sheep getting too much under the shelter of the hedges in stormy or bad weather. Lands can in most cases, however, even where the dunghill is deficient, be better and more favourably prepared for tillage crops by other means than that of the fold, as in the same district, under exactly the same circumstances, one part often folds and the other does not, while its crops are equal or superior in all respects. As to the sheep drawing themselves to the places of shelter in bad seasons, they should by no means be prevented from doing so, as much more may be lost by the injury they would thus sustain than could be gained by the practice. It is surely improper to force them to abide such severity of weather by a confinement quite contrary to their habits. Confining sheep on ploughed land in heavy rains has long been known to be particularly hurtful to them; and the practice of folding the fallows from the layers has no advantage whatever, as what one gains the other loses; the sheep should perhaps seldom or ever be folded while feeding them, as the lands folded from are always much impoverished. Besides, sheep, in such cases, when not folded, do far better, prepare the lands equally well for tillage crops, and distribute the manure in much as regular a manner.

But though the practice in many folding districts has lately been almost wholly given up, as disadvantageous in different respects, in

other places it is still in use, and is considered beneficial both on light and heavy lands, and held to be superior to all other practices.

If, however, it be of such use and value as some pretend to consider it to be, it is very extraordinary that it should be left off in the beginning of the autumn, as is usual, when it might be continued through the winter on dry soils probably with still more profit, as the weather in the latter season is more favourable than in the former for the purpose. Indeed, some consider winter folding as far the most useful, if the practice be at all necessary, contending that the summer practice of it is injurious both to the sheep and the land in the manner already noticed. On lands which are dry, turnips and other such crops should be more cultivated for this use at this season, by which great improvement may be produced in the sheep as well as the land, and consequently much advantage be gained by the flock-master.

In what degree the practice may be indispensable in open sheep walks and other such situations, and how far its necessity may outweigh the benefit of preserving the sheep in their natural habits and in a more favourable condition in all respects, are points which depend much upon local circumstances, and the means of properly preparing the tillage lands for crops without it. But it is not improbable that custom and long usage may have had the principal effect in preserving this practice in many places.

PRACTICES IN FOLDING.

In all cases where folding is found to be proper, it should constantly be carried on and effectually performed, by allowing the sheep only suitable room in the folds, so that they drop a thick covering of dung evenly over the whole, in the course of the nights on which they are folded. This is particularly to be attended to on the tillage lands, until the whole be completed, care being taken never to let the sheep remain upon them when the weather is very wet. In executing the business, those lands which are to be first sown with any sort of crop, should be the first begun, as it is material to have the evacuations of the animals, harrowed or turned in as soon as possible after the folding is done. The whole of the crops should be regularly proceeded with in the same order, as by such means the greatest benefit will arise to the lands.

In some extensive sheep districts of the open pasture kind, the practice is in the early summer months, to fold on the lands designed for turnips, and then on those which are in the course for wheat, and in the winter on such as are intended for pease, oats, or turnips, at which time two folds are considered necessary; one on the arable lands, when sufficiently dry, and the other on the open pasture for penning the sheep on rainy nights, when the tillage grounds are too wet to put them upon. Some store-masters, likewise, fold for green crops, and occasionally on the pasture land a little after the season of lambing, from which period the practice continues until nearly the succeeding lambing time. During that season, and for a few weeks after it, the sheep are penned in standing folds or in the pastures; but the more usual practice is to allow the sheep to lie out of the fold on the open pasture lands for three months or longer in the winter season.

There are, likewise, other practices in folding pursued in different places, according to the nature of the flocks, and the circumstances of the lands, but they have in general much similarity to those already described.

It is proper, in all cases, that the sheep should have suitable room for lying down with ease and convenience in the folds, and that the flocks should be as equal as possible in every respect. It is better for them to have convenient room, if they remain longer on the same spot, than to be too much crowded together; the light dry soils are the most suitable for the purpose, and the greatest advantage is derived to them.

It has been calculated by some graziers, that a flock of sheep, in such situations, of about five hundred, will be equal to the folding of twenty-eight square perches of land in each night, which is at the rate of about fifty acres in the year, allowing the practice to be omitted for two months during that time. The value of the practice must, of course, be different in different circumstances, and it has been stated to be from upwards of thirty, to more than forty shillings the acre, but probably without fully taking the injury to the sheep into the account; as when that and other bad points in such management are fairly estimated, it must stand at much lower value, so as in many cases to be even very disadvantageous. The practice is, however, in many instances convenient, and has its advocates in different situations, where it is thought little expensive and highly valuable. But even in some of these, it has been suggested, that great benefits might arise from the flocks being more divided.

It is usual to fold all sorts of lean sheep, but the practice is found to be unfavourable to those which are fattening, or have much inclination to that state, as they never go on well in this sort of folding.

SORTS OF SHEEP MOST PROPER.

In this business, the sheep which seem from actual trials to stand the fold the best with the worst keep, are those of the South-down kind; but the Norfolk, the Dorset, and the Wiltshire sorts, are very suitable for the practice in many cases. The smaller sorts of sheep appear, however, the most hardy and beneficial in the work of folding in general, but the Wiltshire are said to stand it well in some places. The large long-woolled sheep are wholly unfit for the purpose in all situations.

Whatever sort of sheep are employed in this way, it should always be the practice to see that the flocks are well attended to, and that all the weak and declining sheep are removed as soon as possible; as otherwise the injury they daily receive must quickly terminate in their destruction, for no kind of sheep management is so detrimental to enfeebled sheep as this, when they are continued in such working flocks.

KEEPING SHEEP IN STANDING FOLDS OR YARDS, AND OTHER PLACES.

There is another practice in this management, by which it has been suggested, that all the benefits of folding may be attained in the winter season, without its inconvenience; while at the same time it affords the addition of shelter. This is by confining the sheep in fixed well-littered folds in yards, or other such places, and letting them have all their food in them, except that of the pasture, on the nights, at that time of the year; as by such means, it is supposed, they may be kept warm and in good order, and a very large quantity of manure may be raised if the business be well conducted, more than equal to that of folding on the land. But however this may be, the confining of sheep in such situations, is quite unnatural to them, and wholly inconsistent with their economy in feeding and resting themselves; and with respect to warmth, as they are clothed in

a coat which transmits heat very slowly, they are probably much less in need of additions to it than is commonly supposed. In the lambing season, and occasionally when the weather is very stormy and severe, such shelter and protection may be beneficial; but in other cases, the closeness and restraint of such places must be greatly hurtful to their growth and condition. Where the above practice in folding or littering prevails, and where the pastures are near, the sheep are brought up at noon for being baited, as well as at night, to rest in them; but where the distance is considerable, instead of being baited at noon, they are brought to the yards sooner in the evenings, and continue there later in the mornings. The practice in such cases, from the warmth, is considered by some as of great use to the young lambs, in preserving them and promoting their growth; and to the store sheep, in rendering them more healthy, while the quantity of manure produced is so great, as to be in all cases of material consequence to the land. By steadily pursuing this practice, through the whole of the winter, into the early spring, with a flock of one hundred sheep, and plenty of litter, it is conceived, that a mass of excellent compost, equal to sixty two-horse loads, may be made, which will be sufficient to dress two acres of land; whereas the same number of sheep folded on the land, supposing it dry enough for the purpose, will not equally manure in the same time one acre. Large yards or folds of this sort are provided in many sheep-districts, which are considered to be very favourable for the animals, and to be more beneficial than leaving them in the fields in the usual manner. But the practice is in every respect at variance with the natural state of the sheep, and there can be no doubt that the system of continually moving them backwards and forwards, is greatly injurious to their improvement, and thus the advantage of the sheep is too much sacrificed to the raising manure.

Wherever such yards or folds are in use, they should be kept constantly well cleaned out and fresh littered, so as to suffer no sort of heating to take place in the materials, as it is very hurtful to the sheep; and some believe them to be injured, by simply resting on such littery matters.

INCLOSING OR FOLDING SHEEP IN EATING OFF CROPS.

The practice of confining sheep in the fields for the purpose of eating off crops of different kinds, is often very beneficial in preventing the waste that must otherwise take place; though it is probable that it may not be the most useful in forwarding their improvement, as whatever tends in any way to restrain their natural dispositions, has more or less an injurious effect. Consequently, in folding sheep with this view, they should have plenty of room left for their falling backwards, as they will thereby mostly go on better in their feeding and taking on flesh, as well as rest more quietly, than where they are restricted to a small space. Besides, most crops, whether of the green or root kind, are eaten off with greater cleanness and less waste in this manner, than when the sheep are closely crowded together. In feeding off crops in this manner, the quantity sufficient for the number of sheep, and the proper extent of fold without restraining them too much, should be accurately calculated; by which means, the greatest saving in the food will be produced, and the sheep will duly advance in their condition.

It is probable, that large pasture grounds may be occasionally divided in this way, with

much advantage, as they will thus better feed more sheep, and greater improvement will accrue to the land.

COTTING OR HOUSING OF SHEEP.

Whether the practice of cotting or confining sheep in houses, took its rise in the open state of the country, and the danger of their being destroyed by wild animals, or from what other cause, it does not appear that its influence in improving the wool had any share in the business, though in some places where fine wools prevail, that quality has been attributed in some measure to the enclosing the sheep in the night-time in such houses. It is a method, which, whatever may be the effects of it in bettering and increasing the goodness of the fleece, seems to be much at variance with the nature and economy of the sheep, exposing them to much inconvenience and mischief in many respects. From their being so much crowded together, and heated in such close confined places, they must, of course, when turned out in the mornings, suffer greatly from cold, and be liable to injury of almost every sort. They are thereby, indeed, generally so checked and retarded in their thriving, that the loss is scarcely to be calculated; while the necessity of the practice is quite doubtful, when the nature of the coats of sheep are well considered, and that of the inconvenience which they sustain by any sort of restraint on their natural habits well attended to. Nor would there probably be much improvement afforded by having such cots or houses rendered more spacious and airy, as has been suggested, nor by any management of the sheep within them, as it is their confinement and the want of their natural habits and natural modes of feeding and taking their rest, that seem most materially to operate against them in this sort of management. The pasture keeping of sheep in the winter season, in the bleak exposed marsh districts, in the south as well as the north-eastern and other parts of the country, where so many are kept, and where they are frequently left without almost any sort of screen or protection, to the severe effects of the weather, with but very sparing supplies of food, fully shews the unfitness and bad consequences of too much shelter and warmth; for, although so greatly exposed to such severities, they are generally found to become fat much earlier in the spring than others that have been kept where there was more shelter and protection for them. Too much shelter and warmth has likewise been found to act unfavourably on sheep in some instances, by retarding their progress in gaining condition; and the custom of housing them for that purpose has been long known to injure their thriving, so much so, that it is common to notice that such flocks are always poor but never fat. Some breeders think, too, that this practice has much less effect on the wool than is commonly supposed, and that in some cases it may be injurious to it. We are, however, so much accustomed to suppose, that the habits and feelings of animals are like those of ourselves, that nothing short of actual experience and trial will convince many that the shelter and protection of houses are prejudicial to those of the sheep kind; but if the trial be fairly made, it will shew that the effects are far greater than could possibly have been supposed.

If it be considered that this practice has been little, if at all, made use of in several large sheep districts, and that in others, where it formerly greatly prevailed, it has now either been wholly given up, or is much on the decline; it may fairly be presumed, that it is

neither so necessary nor so beneficial as it has been supposed to be; and that, whatever sort of proceeding is had recourse to in the managing of such animals, which has a tendency to reduce their condition, must be highly detrimental to them, and unprofitable to the stock-master.

Some sorts of sheep are, however, housed in bad and unfavourable weather in the winter time, and it is said with considerable benefit to their health and condition, as well as the improvement of their wool; but in general the practice is by no means advisable, except in the view of the improvement of the fleece, which may be probably bettered by the practice in many respects and points of importance.

GREASING, SALVING, OR SMEARING.

The practice of laying sheep over in the beginning of the autumn with some kind of unctuous material, is still prevalent in some parts of the north, though not used in the southern parts of the kingdom. It is considered greatly useful in improving the wool, benefiting the health and condition of the sheep, and preserving them from disease and vermin. It is done by means of butter melted with a small portion of tar; and the more there is of the former in the composition, the better and more soft and silky the wool, it is said, becomes. When practised on the hilly districts of the north, with the fine-woolled sheep, the wool bears a higher price in the great wool-markets there, in proportion to its relative fineness, than any other of the country, in consequence of the superior softness of the cloth made from it. The only inconvenience attending this practice is, that the whiteness of the fleece is in some measure affected by it; and it is not suited for white stoved cloths, or for any delicate colours. If the discovery of any cheap substitute for tar could be made, the practice would probably be of vast benefit to other more southern sheep districts, where the pastures are of the calcareous kinds. It has the sanction, too, of early times, as the skins of the sheep then were anointed with oily mixtures, as is evident from the accounts of the Romish flocks.

It is advised, that in order to derive the greatest possible benefit from the practice of greasing sheep with the view to the wool or fleece, it should be applied at least twice in the year, once during the great heats of the summer, and again about the beginning of the autumn. In the former season, the ointment which is made use of should be more thin and oily; and in the latter, it should be thicker, with more body; it should be put more closely and evenly to the skin, by means of the fore-finger. Proper sheds, at a small distance from each other, should previously be provided for the purpose. In this manner, besides the advantage to the wool, the sheep are kept warm, and free from most sorts of disease, and the different kinds of vermin to which they are liable are destroyed.

Very great benefit is said to be gained by this mode of greasing sheep in Northumberland, in so far as the softness of the wool is concerned. In some other districts in the same neighbourhood, it has also been employed with considerable utility in improving the fleece. In Lancashire, the same practice has long existed, with a view to the health of the sheep; the application of the grease being made in a very careful manner, in close sheds, and well put down to the skin by the fore-finger, but too much tar is probably employed. Different proportions of butter and tar are had recourse to in different districts and places, so that there is no certainty as to the exact proportions; but, until some better material can be discovered

than tar, the less of it that is used the better, provided that there be sufficient to give it a proper degree of consistence and tenacity.

WATERING SHEEP.

This is a practice which is sometimes had recourse to, instead of that of salving the sheep, but it is very improper, as tending to injure the wool. It is usually done by means of a decoction of tobacco in strong urine, with a little oil of turpentine, prepared by boiling one pound of the former in eighteen quarts of the latter; then straining the liquor, and adding oil of turpentine, three pounds, so as to form a mixture. In some cases, a little soft soap is put to the whole, with a view to improve the wool; but from the alkali which it contains, it is evidently very improper. It is said, to cure the scab, tick, and lice, and to be sufficient for forty sheep. Washes of this sort are never to be employed where the wool or fleece is expected to derive any kind of improvement.

SECTION IX.—*Necessary Attention in Washing, Shearing, or Clipping and Marking Sheep.*

THERE are several circumstances necessary to be attended to for performing these different operations, in the most safe and effectual manner, for the benefit of the stock-master; although in many large sheep-districts too little care is bestowed on the business, and, consequently, much loss is often sustained.

WASHING.

The fleeces of sheep being much loaded in the summer season with great quantities of dust and filthy matters of many kinds, it becomes necessary in preparing them for being shorn, to have them washed. It is a practice which prevails through most parts of the country with the long-woolled sheep, and pretty generally, also, with those which afford the short wool; the latter, however, is more difficult in the execution, in consequence of the close-matted state of the fleece, and of the greater quantity of grease or yolk. Yet, in a south-western sheep district, it has been long a custom never to wash the short-woolled sheep, but to shear them in the unwashed state, as is constantly done in Spain, and frequently in this country, with the fine-woolled sheep. The washing practice is now, however, beginning to spread in some parts of the above district, in consequence of the great increase of price in the washed wool, over that in the yolk, which in some sorts is nearly one-third; the weight of the fleece in the latter state being to that in the former, as six and three quarters to five, and the consequent value of it in the same proportion, or as six shillings and ninepence to seven shillings the fleece, which evident advantage has at length induced the washing of the short-woolled sheep before they are shorn, but to dispose of the long and coarse stapled fleeces in the yolk. Washing would seem to be proper in most cases, as clearing the wool of much filth and nastiness, but it must in some degree lessen the weight, and may in that way be sometimes disadvantageous. It is performed with great care and attention in the fine-woolled sheep of some other countries.

In the execution of the business, the former method of the men standing in the water was highly dangerous, and objectionable on many accounts; but the improved manner of railing off a portion of some water of the stream kind, if possible, and making a sloping entrance or mouth at one end of it, for the sheep to walk

in by, with a depth sufficient at one part for them to swim and go out at another mouth, the whole being paved, has with the other contrivances mentioned hereafter, effectually removed all difficulties and objections. The breadth of such railed-off space, in most cases, need not be more than about six feet, having at one place on the sides of it, where the depth is just sufficient for the water to flow over the backs of the sheep, casks let in and fixed, or leaded, so as to allow the men to stand dry in them; the sheep being in the water between them, are washed thoroughly, by squeezing the wool in their hands and other ways, and are then pushed on, so as to swim through the deep part, against the stream, if there be one, and pass out at the other opening, where they are received in a clean dry place. There are bridge passages to the casks, and a pen at the entrance of the water for turning the sheep into for a few minutes, in order to soak the wool, before they are put forward to the washers. A stream is always to be preferred for this purpose, as by having the whole pointing against it, the thick or foul water keeps draining from the sheep; and while they are swimming out against it, the outside of the wool is rendered clean. But in other cases, simple contrivances of a similar nature, according to circumstances, may be provided without difficulty in most places.

One point of material consideration in this business, but which is not always sufficiently attended to, is that of having the sheep properly coolled after they have been brought from the grounds to the washing-places, before they are put into the water, as otherwise they are liable to catch severe colds and other inflammatory affections. And in putting them into the pens, when the water is suitable, before they are turned to the washers, it should only be for two or three or a very few minutes; as when they are kept in it long and many together, however useful it may be in getting the wool clean, some of them are necessarily exposed to great injuries, so as to have the powers of life nearly destroyed. Such consequences should, therefore, be always well guarded against, by letting only a few in at a time from the places where they are kept, and those for only a very short period.

It is of much consequence likewise to the wool, as well as the sheep, to have the washing done in fine and fair weather, as under contrary circumstances, the water remains so long upon them as greatly to injure both.

As soon as they have been washed, the sheep should have a clean dry hard pasture, where there are no pits, banks, or other places against which they can rub and dirty themselves, so as to injure the fleece by spoiling the colour. When the sheep are become quite dry, as in from ten to fourteen days, they are in the state to be shorn, which should be done as soon afterwards as possible. They should at no time from the period of washing be suffered to move on dry dusty roads of any kind.

The lambs, which should always be separated from the ewes and other sheep before the washing begins, and be put into a pen or place by themselves, are only to be just swilled about in the water, and passed through it, without being much handled by the washers, as they become sufficiently clean in their coats in that way, and require no farther trouble. It is in all cases a proper practice, when the lambs are to be shorn, to wash them at the time the old sheep are washed, as it is a saving of much time and trouble.

Some better sort of washing than that which is usually practised for the fine-woolled native

sheep seems to be much required, as they cannot be made sufficiently clean without lie and warm water, or some other such practice, cold water, from the closeness of the fleece, having little or no effect.

SHEARING OR CLIPPING.

The proper time for performing this sort of business must necessarily depend on different circumstances; but it is in general regulated by the nature of the sheep, the situation, the state of the weather, and that of the distance of the time from the washing. It should, however, be done neither at too early or too late a period, as the sheep may suffer injury in the one case by too much cold, and in the other by too great heat. And the wool should always be in the perfect state of its growth, as there may be disdvantages in cutting it too soon as well as too late. In the more warm and close situations of the country, the early part of June, in most cases, is very proper; but in the more open and exposed parts of it, the latter end of it, or the beginning of the succeeding month, may be more suitable. The fat and fattening sheep should, in all cases and situations, be shorn more early than the lean, as the increasing heat of the weather, added to that of the fleeces, greatly injures them. In the southern marsh sheep tracts, where the shearing begins towards the end of June, and terminates about the middle of the following month, those who shear soon think they escape the effects of the fly, and those who do it late suppose they gain half a pound weight in every fleece by the increased perspiration of the sheep. In early shearing the wool has not the condition which it afterwards acquires, but the hot weather occasions considerable trouble in guarding against the fly.

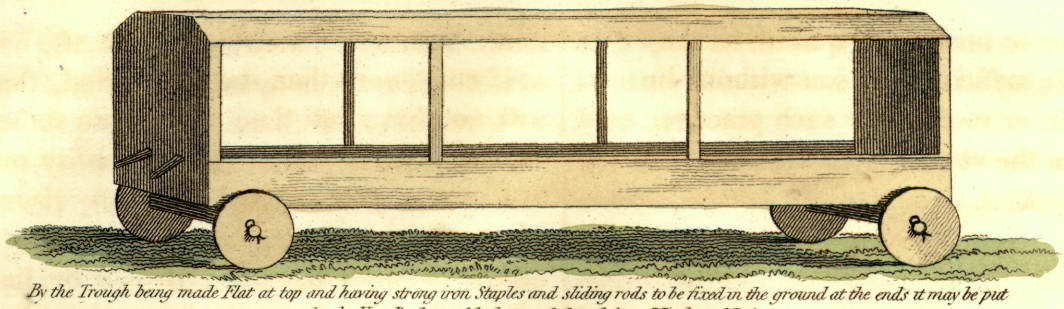
From ten days to a fortnight usually elapses from the time of washing to that of shearing, as if cut sooner than the first period, the wool will not have had time to become sufficiently dry, or to have had its proper quality restored to it, as the yolk will not have fully risen; and when cut in such a state, or in a state of moisture from any other cause, it will be liable to take on heat in the lump, be much reduced in weight, and be greatly lessened in value. It is consequently necessary, in all cases, that the fleeces of sheep be quite dry when shorn. Some persons imagine that benefit arises from confining the sheep in a house for a few nights before they are shorn, by softening the wool, causing the yolk to rise more equally, increasing the weight, and rendering it of more value, in consequence of the perspiration which is thus produced.

In cases where the shearing is protracted too long after the washing, the coats of the sheep are apt to get soiled again and thereby much impaired in value. It is, therefore, essential to be exact in the time which is the most suitable for the purpose.

In performing the work of shearing the sheep, it was formerly the practice to do it lengthways of the animals, and sometimes in many different directions; but more lately a very great improvement has been effected in the business, particularly in the more southern sheep districts, by employing the circular mode or that round the sheep; a practice which has by slow degrees extended itself from the more northern parts of the kingdom, by which method there is less wool lost by being left upon the sheep, and the work is more readily and conveniently executed. The old method of performing the business was the most awkward and inconvenient that can possibly be conceived; while in that which is now made use of, there is so much facility and readiness, that

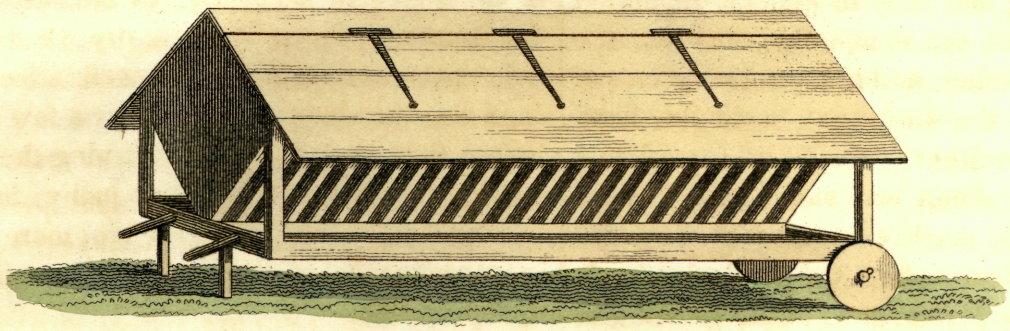
Modes of Feeding and Washing Sheep.

Corn, Meat or Bran Trough.

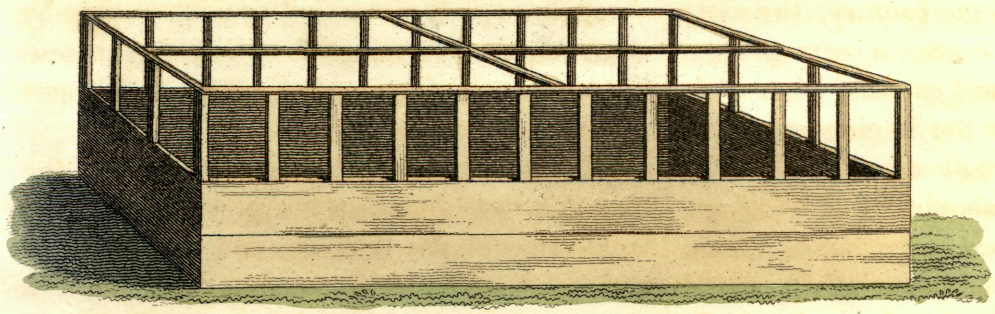


By the Trough being made Flat at top and having strong iron Staples and sliding rods to be fixed in the ground at the ends it may be put under the Hay Rack and be better sheltered from Winds and Rain.

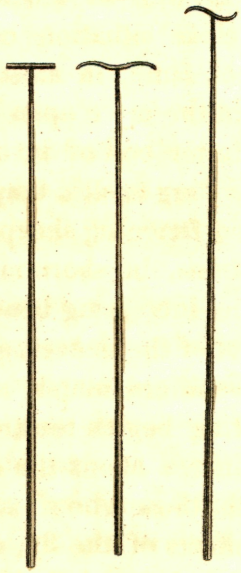
Covered Hay Rack.



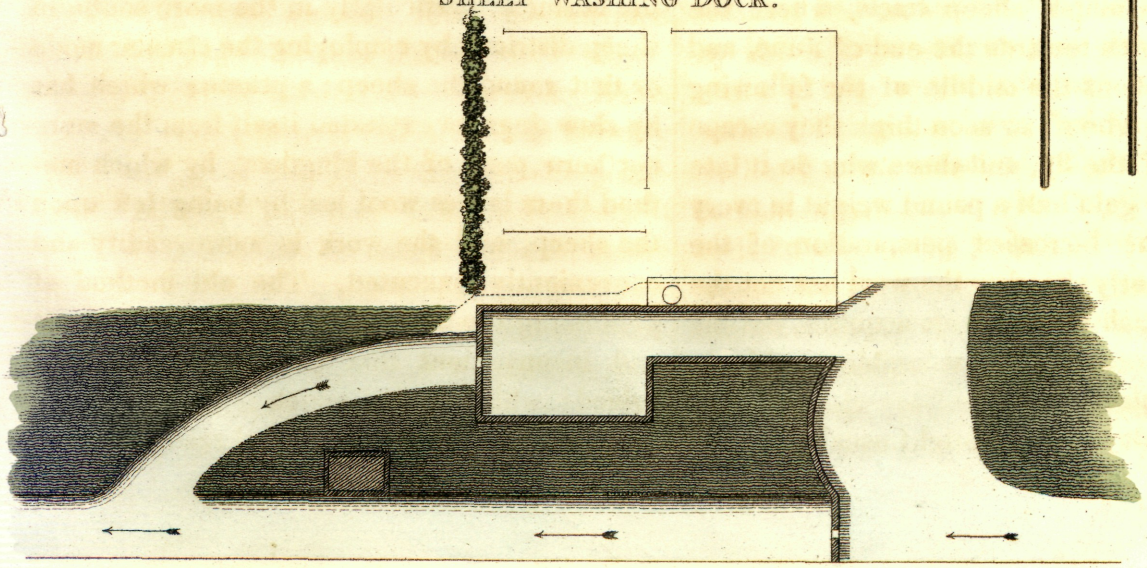
Open Hay Rack.



Sheep Washing Hooks.



Sheep Washing Dock.



London Printed for Thomas Kelly *17 Paternoster Row. June 20. 1823.*

the business of shearing is easily performed in an exact and perfect manner. It is to begin at the back part of the head, so as to give room for the shears to make their way down the right side of the neck to the open part of the breast. Then kneeling so as to rest on the right knee, laying the head of the sheep over the left, in the bent position; the breast is then begun, when the under side of the throat upwards to the left cheek is clipped, when the back part of the neck is taken off all the way down below the left shoulder. The contrary side is then begun upon, and way made down to the opening of the right flank. This done, the breast is returned to, and the belly part taken off, after which it matters not which side is clipped first, as the operator being able to clip with either hand, the shear points are made to meet exactly at the middle of the back all the way until arrived at the thighs or legs. The sheep being then placed on its left side, and the right foot put over the neck, and the other forward to the undermost hind leg, the right side is cleared; when, turning the sheep over, the whole is finished. The ability of clipping or shearing with either hand is a very great acquisition in this business, and one which should be more practised, not only on account of its convenience, but as a method of doing the work in a much neater and more complete manner. Where shearing is awkwardly executed, many parts escape untouched, as the heads, tails, insides of the thighs, and other places, by which much wool is left and lost.

In the execution of this work much care and attention should be taken not to cut or prick the sheep by the shears, as such accidents may be of great injury to them, and sometimes prove dangerous. In case they do, however, happen, as will sometimes be the case, even with the greatest care, they should be well touched with some sort of dressing, which may have the power of preventing any further bad consequences, as soon as possible; such as tar or sheep-salve, melted resin and oil, or the spirit of turpentine, which last remedy is common in large sheep districts, and very ready in its application: if the parts should not have been cut clearly out, but a sort of snipped point left, that should be wholly removed, as inflammation is more likely to take place when that is not done. Where the turpentine is employed, a little tar or some other such substance must be afterwards applied to keep off the flies.

Some other sorts of accidents that occasionally occur in this business, should likewise be well guarded against; such as those of bruising the sheep by too coarse handling of them, especially when in the fat state, as they are then soon injured in that way, dragging them rudely by the hind legs, and not taking them by the heads at the same time, in bringing them to the shearers; keeping them tied by the legs too long in the clipping, so as to bring on cramps and colics, which soon destroy them; and some other accidents, which strongly shew the propriety of always employing persons who are steady and careful in this sort of work.

Sheep which are newly shorn should constantly be put into pastures or other places where there are no stinging plants or other matters that can hurt them, as they are very susceptible of injury at such times.

It is a highly-useful custom, which is had recourse to in some large sheep districts, to have all the coarse soiled wool from about the thighs and docks clipped away, some time before the common period of washing and shearing the sheep, as it has the effect of keeping

the animals clean and cool at the time the season is hot, and of preventing the udders in the ewes from becoming sore. The quantity of this sort of locks which is produced from each sheep, in some of the smaller fine-woolled breeds, is about four ounces.

The attempts for shearing sheep more than once in the year, in the view of raising finer and larger quantities of wool, as well as those for clothing them, have not succeeded in any way that can be of general utility, as nothing of that sort seems capable of being done without considerably injuring the sheep.

WINDING THE WOOL.

In the winding the wool, considerable care and attention are necessary, in order to have it done in a proper manner; or so that none of the fleeces may be broken; that not more than one fleece may be wrapped up in the same parcel; that they be wrapped up free from dirt; and that in making up the pile the whole of the fleeces be put equally in the face of it. In some places, the whole remains packed up on the ground-floors; in others, it is put into proper places of other kinds; and by some it is constantly stored up in lofts or upper chambers appropriated to the purpose. The best situations for the purpose are not, however, well ascertained, but too much moisture appears to be hurtful.

SHEARING THE LAMBS.

The shearing of lambs which are proper to be shorn, generally takes place at or about the time the old sheep are clipped, and nearly the same method is followed in performing the work. In the lambs of the short-woolled breeds of sheep, this has been found to be an useful and beneficial custom, as being attended with several advantages, the wool in such sheep never being too short for the purposes for which it is wanted. But in those of the long-woolled kinds it has been ascertained, from actual trials, to be improper and disadvantageous, as the combing wool of such sheep is rarely if ever too long, when of the proper kind, for the intended uses; and, therefore, that of the lamb will be of more value in the future fleece than it can be in its present state, for such uses as it is put to in the making of hats and other such applications. In some places, the practice of shearing even the short-woolled lambs has been relinquished as injurious, by hindering their growth; but in others no such effects have in any way been perceptible. On the contrary, it is considered to have a tendency to improve the wool, and cause it to throw out a more luxuriant staple. The practice is, therefore, right, though the profit is so trifling as to but a little more than pay the expenses of the work, which has probably been the reason why it has been so much overlooked in so many places, to the loss of individuals and the nation. The lambs of this sort, in some places, may be more saleable when left in their full coats than when shorn, but this will be but seldom the case.

At this time, also, in some places, the lambs are dressed, with a view of destroying the vermin that fix upon them, by slightly dipping them in a strong solution of arsenic in water; which prevents these insects impeding their growth and condition, and from staining the whiteness of their coats by their nastiness, which is thus washed away.

MARKING, OR BRANDING AND DOCKING.

It is usual, after the shearing of the sheep, to mark or brand them in some particular man-

ner, by which they may be known, either by means of tar, raddle, wad, or some other such substance, and sometimes by both. But tar is objectionable, as injuring the wool, and, of course, is to be avoided as much as possible; this cannot, however, be done in all cases and circumstances, and it must, therefore, be considered on what part of the sheep it may be put with the least disadvantage to the fleece. In most instances it is put where the wool is of the least value, as the top of the head, low on the thigh, and just above the tail; but it is not unfrequently placed on the full sides of the sheep, where it is most hurtful to the fleeces, and must cause great trouble and loss in removing it. It may be very properly put as close to the tail as it can, as it will there, in most cases, be of but little injury to the fleece, and will always be readily seen. But it is best to avoid the use of it altogether, which may probably be done by employing a composition, consisting of good tallow melted with an eighth or tenth part of its weight of fine tar, and a sixteenth or twentieth part of yellow resin, stirring in with them, until of the proper consistence, lamp black or fine dust of charcoal, and then using it while a little warm; as it resists the effects of the weather well, is durable, and capable, at the same time, of being readily washed out of the wool by sope or chamber-lie.

The marking of sheep, whether by these methods or by cutting their ears in different manners, is very useful and proper on many occasions, and for several different purposes, as distinguishing particular sheep and flocks of different owners, pointing out the several different sorts, and shewing the practices which are necessary with the various kinds in different circumstances.

In every sheep-district, with the exception of that of Dorsetshire, the tails of the young sheep are at this time shortened, which is a very useful practice in keeping them clean behind, and, consequently, less liable to be stricken by the fly; though, on the other hand, it is suggested, that it may be the means of rendering them less capable of driving off the flies when they annoy them. The very general prevalence of opinion is, however, in favour of its being beneficial. The length at which the remaining portion of the tail is left, is materially different in different practices, but about four inches is in general sufficient. The business of docking is best performed while the sheep are young; but it is sometimes done later without any bad effects. It should always be executed by a sharp and rather heavy instrument, so as to be accomplished at a stroke without bruising.

SHEPHERDING AND MANAGING.

In the care and management of sheep, it is evident that in all cases much must depend upon the person who has the charge of them; who should be well acquainted with their nature, habits, and economy, and perfectly accustomed to the different modes and practices in their management: as where there is a deficiency in these respects, or a want of general information on the various matters which relate to the business, the flock-master must unavoidably suffer great disappointment and loss. Such persons should also always possess much activity, patience, and good-nature, and an inclination to the performance of the whole of their duty, in a careful, diligent, and proper manner; as inattention, neglect, and want of thought, in such business, are too often attended with consequences of the worst kind to the flocks and their owners.

SECTION X.—*Practices employed in fattening Lambs.*

THESE practices differ according to different intentions, as they severally relate to having the lamb more early or late in the market; as the same modes of feeding and management are not applicable in the different cases, but require to be much varied, in order to suit the different purposes, in the best and most perfect manner.

EARLY LAMB-SUCKLING, FATTENING IN THE HOUSE, OR HOUSE-LAMB.

This is a practice in fattening lambs for the early market, which is often very beneficial, and answers well in situations that are near large towns, there being considerable profit attached to it when well executed, though the greatest care and attention are necessary. It is now performed in almost every degree of earliness, in many places, and especially about the metropolis. In the view of executing it in the most convenient and successful manner, where carried to any considerable extent, a lamb-house or suckle, of the proper size, is necessary. In practice, a range of the high shed, or other cheap building, of from about thirty to thirty-five feet in length, having the breadth of ten or twelve, will be found sufficiently ample for carrying on the business, with eighty or ninety lambs. There should be at each end of it two or more divisions, of different sizes, made with smooth materials, for separating and holding the lambs, according to their different ages and growths. And the ewes, when the lambs are taken from them, should be kept apart, in the middle space of the house, by smooth deal hurdles, so as that the lambs, when they are to suck, may readily find, and get at, their mothers. In the same place, there should likewise be a very shallow flat trough, and a rack fixed in a proper manner, for the uses and purposes which will be mentioned hereafter. Thus fitted up, the house or suckle will be ready for the reception of the lambs.

The next step in this practice of fattening lambs, is that of providing the proper sort of ewes in lamb, sufficiently forward for, the purpose. This is the more readily done, as there is only one sort of ewe sheep in this country, which is in every respect suited to, and proper for the purpose, though there are several that will take the ram, and produce lambs early enough, but which are not capable of fattening them at that period of the season. This sort is the earliest kind of ewes of the Dorset breed, as the others even of that sort will not be ready sufficiently early for making their young fat as house-lamb. But they may any of them be rendered much forwarder than usual, by good suitable keep. Another matter of importance in this business is, that of the ewes producing lambs, which will die *fair*, that is, whose flesh will be of a fine white colour. On this account, the breeders and house-lamb sucklers in some places are particularly careful in getting rams which can be depended upon, as producing lambs whose flesh is of the proper complexion; as the ewe-stock, in lamb, which is picked up at the different fairs and markets, cannot be warranted to produce lambs with such properties. The sharpness or natural bluntness of the barbs, or points of the teeth in the front of the mouths of lambs of this sort, being supposed, in the former, to shew an improper colour of the meat, and in the latter, that which is fair and proper; such a distinction, has consequently, caused male lambs of the latter description to be often preserved as rams, with the direct purpose of improving the colour of the meat of such lamb; as the produce of such rams can in general be

much depended on, as affording meat of the proper colour and value.

This is, therefore, a point to be well considered and attended to in conducting this sort of lamb-fattening business to the most advantage.

In this practice, the lambs are to be kept constantly in the house, as clean, dry, and warm, as possible, in the several divisions that have been already noticed.

The ewes, which have been provided with proper care as above, are to be well attended to and kept, both before they drop their lambs and afterwards, as it is of much consequence to the future benefit of themselves and their lambs, as well as to the advantage of the suckler or whoever is engaged in the business. Nothing is ever saved by bad keeping in this process of fattening, but much is often lost by it in retarding the due progress which should be constantly advancing. The lambs, which should begin to drop in the commencement of the autumn, after being sufficient in number, twelve, fifteen, or more, according to the nature of the situation and circumstances, are to be collected and put up into the house in order to begin the business. With a view to the lambs feeding and getting on in the most ready and expeditious manner, the house should be preserved as warm, quiet, and undisturbed as possible, being always well littered with fresh, clean, wheat-straw. Every sort of dirt and nastiness which may be produced, or any such matters which may have fastened themselves upon the divisions, pens, hurdles, or any other parts, should be constantly cleaned and washed away, so as to render the whole perfectly sweet and free from any kind of disagreeable smell, as without great care in these respects, the lambs never thrive well. There are several other points which are equally necessary to be attended to: thus, in order to prevent the stomachs of the lambs from being disordered by any over-abundant acidity that may prevail in them, common chalk, in the burnt or prepared state, as well in the lump as in powder, should be plentifully provided, and so placed that it may be licked conveniently by the lambs, and thereby may correct any disposition to looseness, which would be greatly injurious to them, and hinder their getting readily fat. As they are always much disposed to suck any thing that may be in their way, it is proper to have a little fresh clean wheat-straw put with the ear ends downwards, within their reach, in the rack already noticed, so that they may eat and nibble at it as they please. Continued supplies of fresh clean wheat and other proper nourishing matters, should likewise be very frequently placed in the different divisions of the shallow trough which has been spoken of before, that the feeding of the lambs may suffer the least possible delay. Should there be tar or pitch marks on the ewes, they should in all cases be clipped away, as the lambs may get at them and be thereby injured. Local diseases of the skin and feet, of all kinds, in the ewes, should be carefully and well guarded against, as they would be greatly hurtful to them in their suckling.

These matters being properly arranged, the keep and management of the ewes are to be well attended to, in order to support and keep them up as much as possible under this exhausting and sinking practice. In this intention, they are to be very carefully kept in the day in some dry warm pasture near the suckling house, where there is plenty of good short grass to feed on, and are to be put in the house at night; but where such pasture is not to be had, they should have frequent supplies

of such sorts of green food as become ready in turn, such as turnips of the common or Swedish kind, rape, rye, tares, red clover, and sainfoin; and with the grass pasture, as well as with these green crops, when not in plenty, good fresh brewer's grains are to be used in troughs suitable for the purpose, and proper quantities of fresh green rouen hay in racks. Such methods of high feeding are requisite, not only for keeping up and supporting the ewes, but also for producing full and ample supplies of milk for the lambs, so that all danger of their being in any way checked in their growth and progress to fatness may be prevented; for if such a check takes place, no sort of feeding or management can afterwards bring them forward again in a proper manner.

The mode of practice which is usually employed in the suckling-house, in places where the business is executed in the best manner, is, to turn the mother of each lamb, every night about eight o'clock, into the lamb-house to the lambs, letting them remain with them during the night, and about six o'clock in the morning separating them from them, and putting them into the pasture again; then at about eight or nine o'clock in the day, all such ewes as have lost their own lambs, or the lambs of which have been sold off, are to be brought in, and held by the heads, or put into close pens for the purpose, until they have been sucked clean by the lambs in turns, after which they are returned to the pasture: and at twelve o'clock the mothers of the lambs are fetched up from the pasture into the lamb-house for about an hour, in which time each lamb is fully suckled by its mother: at four o'clock, all the ewes which have no lambs are again brought up into the house, and secured to be sucked by the lambs as before; and at eight the business is closed by the mothers of the lambs being put to them in the house for the night.

In case any ewe gives more milk than her lamb can suck, the over quantity is applied to twins, if there be any, or to any lamb which the mother may be incapable of properly supplying with it. But in all such cases the ewes must be held or put in proper pens, as otherwise they would not suffer the strange lambs to suck.

In this practice of lamb-feeding, the lambs are to be continued in the house until they have reached the proper state of fatness for the markets, which is usually in about eight or ten weeks, when those which are fit should be drawn out for sale, in order that others may be brought forward with more advantage. The earlier that house-lamb can be got ready in the beginning of the winter months, the more advantageous the practice will be, as it then fetches the best price.

The most material circumstances to be attended to in this system of fattening, are, therefore, those of having the lambs ready at an early period, their being of the proper delicate white colour in their flesh, and their being regularly, warmly, cleanly, and quietly, kept and suckled; the ewes being of the right sort and the most plentiful milkers; their being constantly well supplied with food of the most nutritious and juicy kinds, and their being preserved perfectly clean, sweet, and free, in their udders. Their food, by being properly varied, may likewise be of greater use in the business.

Towards the close of their fattening progress, the lambs may also derive much benefit from having constant fresh supplies of the mixed meals of different kinds, as those of wheat, barley, white peas, and others of the

same nature, in connexion with the finest green rouen hay that can be had. House-lambs are sometimes subject to sore mouths, which may be easily removed by a solution of borax.

In this business, the fat lambs may be safely conveyed from a distance to the places where they are wanted, by means of light carts with springs, by which means the practice may be well carried on in situations where it has not yet been attempted.

LATE LAMB-FATTENING, OR GRASS-LAMB.

This is a practice in lamb-fattening which takes place at a later period than the former, and which is effected in the more early states of it, by the milk of the ewes in the field, with but a little grass; while in the latter, it is principally accomplished by grass alone. The business of raising and providing lamb in this way is extremely profitable in many situations and places where it can be done sufficiently early in the beginning of the spring, as few methods of management with lambs pay better, or require less trouble and expense. It can only, however, be had recourse to with advantage for early grass lamb, where the pastures are dry, warm, early, and good, and where the lands are well sheltered and protected from the severities of the weather. Under the contrary circumstances, it cannot be attempted with much chance of benefit to those engaged in it.

If the intention be to raise early grass-lamb in the best manner, and with the greatest profit and success, such ewes must be provided as drop their lambs at sufficiently forward periods, namely, about the beginning of the year. This will be best done by making use of proper ewes of the Dorset sorts, as they can be the most depended on, not only for furnishing lambs so soon in the season, but for rendering them properly fat at that time. But for the later grass-lamb, any of the other sorts of ewes that are of the more quick-feeding kinds, will answer the purpose very well, as the South-Downs, new Leicesters and some others.

The proper keeping of the ewes is the next point of material importance in the business; which, in order that they may have constantly a plentiful supply of milk for fattening their lambs, and be prevented from shrinking in condition themselves, should always be as full and good as the nature of the land and situation will afford. For which purpose the preparing and reserving of crops, that are the most suitable and useful in the practice, are essential. These may be turnips of the common or Swedish kind, rape, rye-grass, and others of the same sorts; of which, in their turns, they should have frequent supplies given them in the course of the day, with the pasture keep, and a little dry cut hay of some good sort. By this high keep, where the pasture is dry and in a good short bite, the lambs will be brought on in such an expeditious and ready manner, as to be fit for the butcher early in the beginning spring months, when the price of such lamb is at the highest. Thus, not only every possible advantage and profit will be derived from the lambs, but from the ewes also; which, in consequence of their being so well kept up in their condition, and becoming so early in the season in the dry state, will be ready to be put so soon to be fattened. At first, the more early may have turnips, clover, and oil-cake, when the weather is mild, but not when it is frosty, as they would then destroy them.

The great benefit, in this mode of conducting the business, materially depends upon attending well to all these several points of it, as where that is not the case, from the great

expense that accompanies it, there may be considerable loss sustained. If there is any neglect of such full feeding and keeping, the ewes are liable to get lean, and quite out of condition, on account of the great exhaustion occasioned by the sucking of the lambs, and will consequently be much longer and more tedious in being restored again to the thriving and fattening states.

With the late grass-lamb ewes, the keeping need not be so high, but it it should be good, either of the common or artificial pasture kind, such as the newer sorts of lays, the early clovers, and many others, in dry warm situations, as circumstances may direct. In these pastures, where good, the lambs, by eating the grass freely, and occasionally sucking the ewes, commonly get well into the fat state and become large in size, so as, in many cases, to pay well for their food, without the ewes being very much reduced and injured in their condition,

In this late practice of grass-lamb fattening, where the ewes decline much in their condition, and lose their milk in a great degree, it is found useful to take the lambs from them, and have them fed out, or made completely fat on such pastures as the above, without the further assistance of the ewes. This is considered by some as by much the best method, when the milk of the ewes becomes in any way scarce, as the lambs then thrive and get on better with the grass alone, without their mothers being with them than when kept in connexion with them, as their inclination for sucking, in such cases, prevents their eating the grass so well or to so much advantage. Proper attention should, therefore, be paid to this point, as the lambs will often by this method get more readily fat, and with less trouble and expense; and there will also be some advantage gained by the ewes being left sooner to themselves. Where the lambs are thus left solely to grass keep in their fattening, it should be always good, ready, and in plenty; of which keep, white and red clover and ray grass are excellent for the purpose, as they may be to be had both early and late. As soon as the falling off in the milking of the ewes is discovered, the lambs should be removed to a proper pasture, and be kept quiet.

These modes of raising fat grass lambs may be beneficially employed in many places.

Section XI.—*Points, Circumstances, and Practices, which are necessary to be attended to in fattening Store Sheep, of different Kinds.*

Having in the preceding section pointed out the most suitable methods to be had recourse to in different cases in the fattening of lambs, it will now be proper to consider those which are the most ready, beneficial, and useful, in effecting the same purpose with grown sheep.

GRAZING, or FATTENING SHEEP WITH GRASS.

In this practice of fattening sheep in the pastures, there are several points which require to be nicely attended to, in order to accomplish it in the most profitable manner; such as the land, the sorts of sheep most proper, the manner of stocking, and the modes of management which are the most suitable in different circumstances.

The quality of the land, in respect to its nature and situation, as well as other circumstances, is always to be well considered in the first place, in order that the sheep-stock the most suitable to it may be provided, and, consequently, the most benefit be derived from it.

The choice of the sheep-stock should be made so as to suit as much as possible the particular nature and qualities of the land, and at the same time to pay the best in the consumption of the peculiar sort of grass herbage which it may afford. Upon the dryer sorts of the heavy rich pasture lands, the larger kinds of sheep-stock will generally be found to answer the most beneficially in this mode of fattening; but on such as are neither so rich or so dry, but which are still proper for sheep, the smaller sorts may afford the most advantage. Where the grass is full, short, close and sweet, it is, in general, in the best state for this purpose. In all cases, whatever the sorts or sizes of the sheep may be, those kinds which have the quality of preserving themselves in condition, and getting into the state of fatness with the least quantity of keep, are always to be preferred. They should, likewise, be selected from both the large long-woolled and fine short-woolled sorts, as they may produce the largest quantities of good mutton and wool in conjunction, and by such means yield the greatest profit.

In regulating the manner of stocking in this method of feeding or fattening, care should constantly be taken that loss be not sustained, by having either too heavy or too light a stock upon the ground, as in the former way there may be disadvantage by the sheep not having sufficient food; and in the latter, by too much grass running to waste. The matter should, therefore, be so nicely attended to and adjusted, as that there may be the least possible loss in either way, it being always most beneficial to have the land stocked with the proportion of sheep it can well carry, and bring properly forward in their fattening progress. The exact number of sheep that can be carried on the acre with the greatest advantage, with other sorts of stock, in different kinds of pasture lands, must evidently vary greatly, according to their quality and other circumstances, and the sort of sheep that are employed: but on the richer sorts, it may generally be estimated about three or four in the summer season, and two in the winter, of the larger kinds; and on those of the inferior sorts, with the smaller kinds of sheep, at about three in the former season, and one and a half in the latter; pastures of the different descriptions giving, in different situations, with sheep and other stock, from about fifty to upwards of one hundred stones of meat from the acre in the course of the year.

In the grazing or pasture mode of fattening sheep, several different practices are pursued, according to different intentions; but whatever these may be, the great object, in many cases, must be that of making as many returns as possible in the year, by constantly providing that sort of sheep-stock which will be the most suitable and proper for carrying such an intention into effect; and at the same time to endeavour to get them ready in as large a proportion as possible to go off at the seasons when the prices are the highest. By such management the most advantage may in general be made in the practice of fattening sheep.

In some instances, it is a very good and beneficial practice, to procure ewes in lamb about the end of the summer and the early part of the autumn, and to let them have the less rich pastures, the stubble etches, and the lands in winter fallow, until about the commencement of the new year, and then to get them forward by turnips or other such matters, where the pastures are insufficient, so as to have them in a good state of condition during the time of their lambing; and after that to support them on the best keep that can be had,

that their lambs may be fattened off sufficiently early to afford time for the ewes being afterwards brought into the fat state, and got off the land in the early part of the autumn.

Young lamb sheep of the wether or other sort, are sometimes made use of in this practice with much benefit, by getting them from the pastures early in the autumn, and forwarding them as fast as possible by the best sorts of keep that can be procured besides the grass; while, in others, they are only kept in a moderately good method during the winter, until the more early part of the spring, when they are forced on by good keep of different kinds, so that they may be ready for the market about the close of the summer season, at which time the whole of the stock is cleared from the land.

In rich, dry, warm pastures, these practices often afford considerable profit; but in other circumstances they can seldom be had recourse to with much chance of benefit. In connexion with them, some sorts of artificial sheep crops should be raised.

Where there are high-land farms, which have warm enclosed pastures, or rich marshes, it is the practice to have the lambs dropped early, and got forward, by keeping the ewes as well as possible, so as to have them put upon the marsh pastures, to be fattened out and got ready in the early spring months. This is a very profitable method, where it can be put in practice with convenience.

With large sheep, in rich marsh pasture districts, it is also the practice to have as many two-year old sheep on as can be properly got forward in the autumn, so that the whole may be made fat and got off before the end of the spring, and the pastures be left ready for a fresh stock.

In these cases the practices differ very much, according to circumstances, but it is in general a good method to get sheep fat, so as to be ready to go off to the best markets and such as are early.

A practice with young wether sheep, which in some cases answers extremely well, is, to provide them about the end of the spring, keep them on the common pastures until sometime after the hay-lands have been cleared, and then to put them upon the after-grasses, so as to force them forward in condition, that they may afterwards be fattened out by means of turnips or other such keep, and be ready early in the beginning of the spring, when mutton is scarce.

The practice of having young sheep, barren ewes, and wethers, put on the land, so as to make different returns in the year, as is the custom with some of the best sheep masters, is generally found to be the most profitable sort of management, in the feeding of such animals; but it requires much knowledge, activity, and capital, to carry it on in the proper manner, as well as a contiguity to fairs and markets, especially where the sheep are not bred as well as fattened on the same farm.

But whatever practices may be employed in effecting this business, it is always a very material point to have the sheep so proportioned and continued upon the lands, as that they may be prevented from rising into any sort of coarseness; as where that is the case, the sheep never go on so well as they should do, it being necessary to their speedy progress, that the grassy herbage of the pastures be constantly kept in a fine, close, even state. With this intention, the changing the sheep much from one pasture to another is unnecessary, and should be had recourse to as little as possible; the advancement in the fattening process being invariably the greatest where the sheep are kept

on the same ground, provided the keep be sufficient for the purpose, which should, of course, be well attended to. For the above reason, a greater increase of sheep should, in most cases, be put upon the feeding pastures, in moist growing seasons, than when they are dry and unfriendly to vegetation. In order that the sheep may be better protected and more quiet, as well as that the grass may be preserved in the close state of bite, rather small enclosed pastures should be preferred than such as are large. All these points, as well as others of a more local nature, are to be well taken into the consideration of the sheep-grazing or pasture-feeding manager, before he enters upon the business, that he may be enabled to ascertain the practices which are most preferable to pursue in the feeding of sheep.

With the pasture keep, it is frequently the case, especially in the winter season, to feed out, or fatten sheep by means of roots of several rich feeding kinds, different dry materials of the more fattening, and other sorts, and various descriptions of fresh green crops, which have properties of the same kind.

PARTIAL FEEDING, OR FATTENING SHEEP WITH ROOTS, DRY SUBSTANCES, AND GREEN CROPS.

In addition to pasture-feeding, sheep are often completed in their fattening process, or wholly rendered fat in the winter, by different other substances which are found, at that season especially, to be more powerful and ready in accomplishing the business. These are of many kinds, such as turnips of the common and Swedish sorts, potatoes in different states, oil-cake, corn pure and in the straw, barley, pea, and bean-meals, bran, hay, and cut chaff, as well as some green crops of particular sorts; all of which are to be well considered in their nature and the effects which they have in forwarding the improvement of the sheep, their differences in expense, and the most beneficial modes of making use of them in the practices which are employed, before the business is begun. It is material, too, that such sorts of food be properly regulated and managed in such feeding, as the sheep never go on in an advantageous manner, where there is any neglect with respect to a suitable supply of such keep at proper times; as where that is the case, they are under the necessity of feeding or eating such food as has been soiled by treading upon and is disliked, or which has become stale by remaining too long in the feeding places. The fattening of sheep, in all cases of this sort, is invariably best promoted by letting them have only the prime or first part of some of these sorts of keep, and the others as fresh as possible, and so varied, as that it may produce the most full effect in the process. There are sorts of the crops used in fattening sheep which it is far more profitable to have eaten off upon the land where they grow than to remove them, as they are found to fatten the sheep with much greater expedition in the former than the latter method, probably in consequence of their being eaten more conveniently and fully, and their retaining their nutritious properties more perfectly in the growing state. However that may be, it is essentially necessary, as to the ready fattening of the sheep, that their food should be completely eaten, be quite in a clean state, and perfectly relished.

TURNIPS FOR SHEEP.

These are roots, the different sorts of which are of very extensive application in this practice of fattening sheep, and which, in many cases, are used by themselves with perfect success, though from their very succulent

nature, it may perhaps be more beneficial and safe to have some kind of dry food given along with them. Both methods are very generally employed, but no trials have been made so as satisfactorily to determine which has the advantage in promoting the fattening process, though the latter would, on many accounts, seem to have the preference, at least with some substances, notwithstanding it has been condemned as injurious with others. The method in which the roots are consumed by the sheep is a very material consideration, as they succeed better by some methods than others. It is usual to let the turnips be fed off by the sheep upon the lands where they grow, or else to remove them to a dry pasture for the purpose. The former is found to be by far the most beneficial method with respect to the progress in the fattening of the sheep, and occasioning less waste and injury of the food, and, when properly conducted, a saving of both time and expense. On all lands which are capable of having the turnips taken from them without injury, they may probably be fed off on them by the sheep with much more benefit than in the contrary practice; so that there cannot be many cases where the drawing and removing them can be had recourse to with advantage. The great point seems to be, that of having the number or proportion of sheep to the weight or quantity of the roots on any given extent of ground as nearly and properly adjusted as may be, always allowing the sheep a full and ample supply for the purpose. This may be done by taking the quantity of such food as is consumed in a day by a sheep, which, from the few trials that have been made in this way, has been shown to be about twenty-three pounds in the large, and twenty-two in the smaller sorts; and comparing it with the weight of the crop on any certain extent, a full good crop having been found, from the most correct trials in weighing it, to afford more than forty tons on the acre. They will, however, vary greatly in different situations and sorts of land, which must be well attended to in every instance. By thus properly regulating the daily consumption of the number of sheep by the length of time they are to be kept on the same space, and the different amount of the crops, the eating of the roots will be accomplished in the most useful manner, the greatest number of sheep will be fattened, and the whole be fully eaten, to the best advantage for the stock and the land. In very good and middling crops of these roots, it will probably be found, that from about a yard to a yard and a half of the square surface will be sufficient to afford the necessary fattening supply for each sheep for the day.

But besides the quantity of the root being well proportioned to the number of the sheep, it is equally necessary that the manner of letting them have the food of this sort be well attended to, as much is gained by it both in the economy of eating off the crops and the progress in the fattening of the animals. Several different methods have been practised in effecting the business, as by consuming them solely by the fattening sheep, or by these and the lean together, in large or small spaces or divisions at a time, and in the standing or growing state, or when drawn up. It is sufficiently ascertained, that fattening sheep go on to the best advantage, and in the most regular manner, when they have only the first or prime part of such roots, as when they are so confined or continued on them as to be under the necessity of eating that portion which has been at first rejected, they will often be at a stand, or go backward in their condition for the time, which is always very detrimental to the feeding

process, as the whole progress is again to be renewed, which is frequently very difficult to effect, and perhaps never can be effected in an equally favourable manner, as the power of reproducing exactly the same degree of action and formation of the matters for giving fatness is destroyed. On this principle, it has constantly been observed, that such animals as have been once in any way checked or stunted in their thriving or growth, never again get forward so well. Fattening sheep should, consequently, never be proceeded with in any way which has a tendency to interrupt or impede their regular progress towards the state of fatness. Of course, it will, in general, be better and more profitable, to eat such root crops off by the fattening and lean sheep together, than by the former alone, the latter following so as to consume the whole of what has been left by the former; as there will, by this method, be the least waste of food and trouble, and each stock will be supported in the most proper manner for its different intention. With but one sort of stock, however the management of the sheep may be, this can never be done, as there will always be a considerable loss sustained by the sheep having to remain so long upon the same spot; as the food will become quite foul and disgusting, and, consequently, be very prejudicial to their progress in fattening; while, at the same time, the quantity of sheep that can be kept and fattened will probably be much less. Besides which, sheep so kept and confined upon such crops, when a new fresh portion is given them, are very liable to be injured by over-greedy feeding.

The extents or divisions of the crops which are most suitable and advantageous to be given at one time to fattening sheep, are different, according to the practice in different places, some preferring them large, others of a middling size, and some quite small. The practice should, however, in some measure, be regulated by the nature of the land, as on the less dry sorts they will constantly be required to be larger, in all probability, than in such as are more free from moisture; and with fattening sheep, it will always be proper to have them larger than with those which are in the lean state. The space, in the fattening practice, should always be such as to allow the sheep to have constantly an ample supply before them for the time they are to continue upon the same division, as they should never be so restricted on such crops, as not to have a choice of the food; for it will be invariably seen, that many of such roots are wholly rejected by such sheep without any apparent reason, and which nothing can make them eat but absolute hunger, which must always be extremely unfavourable by checking the progress in fattening. Such spaces as will afford the sheep plenty of keep for about ten or twelve days at a time, may probably be found the most proper and beneficial in this practice, as in such cases they will neither suffer by too frequent changes, or by remaining too long upon the same divisions. On their removal to another portion, the store-sheep may eat up the refuse roots of the former, and so on in every subsequent division, such root crops thus being consumed with the least possible waste, and most profit, as benefiting the greatest number of sheep. It is now a general custom to have these refuse parts dragged up before turning upon them, whether they are eaten by the store-sheep or the others. In cases where there are not lean sheep to succeed those which are fattening, the same space may first be given to the feeding-sheep, and after that another which will serve them about half the time; during which the first portion may be made ready for the same sheep again,

and that method may be continued: but there will be more loss of food in this way, and a vast disadvantage in the fattening of the sheep.

In the practice of letting the sheep have only a daily small portion or space of these roots, as is common with some feeders, on the supposed principle of saving the food, there must, from the close confined state of the sheep's feeding, evidently be much loss and disadvantage, as the trampling will necessarily cause it to be spoiled, and reduced to a state wholly unfit for the purpose, and the continual removals of the sheep must render them in a perpetual state of restlessness, which is quite incompatible with their fattening properly. Therefore, large, rather than small divisions, in proportion to the number of sheep, would seem, in all cases of this sort of sheep-feeding, to be the most favourable in various respects, and, consequently, that which should in general be pursued. There is likewise much objection to the use of such small spaces in feeding off these roots, in the continual trouble and expense which accompany it.

Regarding the eating of these root crops in their standing or growing state, or consuming them after they have been drawn; there can be no doubt, that so far as the fattening of the sheep is concerned, the former is by much the most beneficial practice; as sheep always eat them more freely and to better effect in the fresh fast state, than in the loose and stale one on the surface of the ground. There is, besides, in the practice of drawing and removing them, considerable disadvantage in the labour and expense which attends it. Some managers, however, have supposed, that sheep are less subject to be disordered by these roots when eaten some time after they have been drawn; but if this be really the case, it can only apply in circumstances of too greedy feeding, which should never be suffered to occur with sheep in the fattening state. It is, therefore, evidently the most profitable and advantageous practice, that such roots should be eaten as much as possible in the growing state, and especially by fattening sheep.

The nature of the crops of these roots, as they regard the fattening of sheep, have hitherto been but little attended to, though something would seem to depend upon it, as some feeders have found, that sheep in this process have gone on better and more expeditiously with these roots, where they were of good sizes, rather than of very small dimensions, and when they approached more to the state of maturity, than in other states. But many persons who are largely engaged in this manner of sheep-feeding have, notwithstanding, been in the habit of preferring the smaller sorts of such roots, as most beneficial for the purpose. It would appear, however, from the constant natural disposition of sheep in such cases being to feed upon the more full-sized roots whenever they can find them, and from their affording the most ready means of filling them, that they are the best calculated for effecting the business with the greatest profit and advantage. It is, further, not improbable, that roots of a good size, of some pounds' weight, for instance, are more sweet and nutritious, as being more perfect, than the very small stunted roots, and on that account may be more beneficial in such feeding. Crops of the medium size will, therefore, probably be the best for this purpose, as well as for that of benefiting the land, at the same time that they are the most free from the danger of injury by the season.

In the use of these roots, when the common sort is done with, the Swedish will be ready as a further supply.

Some feeders have supposed, that there is often much loss, where sheep cannot be completed in their fattening before the winter, as, when put to this food at that time in a state of forwardness, they are apt to go greatly backward. Indeed, the loss occasioned by winter fattening on this food, or keeping sheep which are in a forward condition on it through that season, is, in many cases, considered so great, that they conceive it always advisable to have their sheep ready to go off at the end of the summer, in order to avoid, as they suppose, the complete loss of the winter keep. This arises, most probably, from the want of knowledge of the best and most proper methods of using and applying this sort of food in that practice of fattening; as, in various places, sheep are constantly found to pay so well in such feeding, that the practice continues to be regularly pursued and persevered in with great profit and advantage.

By having recourse to proper and suitable means, such as those detailed above, there is no doubt that sheep may be well and profitably fattened, during the winter, on this useful root; the practice may, however, be more suited to, and answer better with, some sorts of sheep than others, especially those of the larger kinds, which readily take to such food. Some of the true pasture breeds are wholly unfit for the purpose in every respect. The Norfolk and the Wiltshire sorts are generally found to answer well, and prove greatly profitable.

These are the most material points which are necessary to be regarded in the fattening of sheep with turnips; the substances and matters which are occasionally given along with them, and the uses and purposes which they are intended to serve, will hereafter be noticed.

The daily cost in this sort of food in the fattening of a sheep will commonly be about a penny, or sometimes a little more according to circumstances.

POTATOES, AS FATTENING SHEEP FOOD.

This is a root which has lately been applied in some places to the fattening of sheep with much supposed advantage; but it would seem, in general, to be too valuable a food for that purpose. Some, however, think, that if fairly tried, the practice with this root will be found to be the most expeditious of any in fattening sheep, as trials have been made of it with sheep of the same age and flock, against corn of different kinds, and even oil-cake, in which it has been ascertained to effect the purpose in the shortest time. And in further proof of this superiority, it has been found, on placing different sheep from the same common flock in a yard or other such place, with the same number of other sheep that had enjoyed the advantage of the best after-grass, that at the usual time of their going off, there was little or no difference at all in point of their fatness, they each bringing the same price. It is, therefore, considered as the most ready and profitable practice that can be pursued in raising mutton for the table; and at the same time it affords much proof which is an additional excellence.

The practice which is followed by some store-masters in the South Downs, where it is probably most had recourse to, is, with the true breed of that district, after they have had the after-grass pastures, to take them into yards for the purpose, where they have the potato roots given them in a regular manner. This is usually done about the end of the autumn, and they are kept in this manner until they become ready for going off, which is commonly towards the end of February or the beginning of the succeeding month. The potatoes

are given in the cut or sliced state, either in two or more pieces, being deposited in shallow troughs, fixed up under the sheltering parts of the yards. Each sheep, on the average, consumes about a gallon in the course of the day. It appears to be a matter of consequence, that the sheep should have the roots supplied in a fresh state several times in the day; and that a little hay should be given along with them in the morning and evening. This root has likewise been given to sheep in the steamed and baked states, and, it is said, with more effect and advantage than in the raw condition, the food being much better when so prepared. There is, however, the expense of the preparation to be taken into the account, which, though performed by the most cheap and improved contrivances for the purpose, must be considerable, and probably more than the improved quality of the food will repay. The trouble is also a material objection in the business. There can be no doubt, however, but that the food is rendered much better by the operation, as it removes any injurious quality, and if it should be found, on more full experience, to be so much more effectual in forwarding the fattening of the sheep, as to make up for the disadvantages of the preparation, it may be better to use it in that state, as, doubtless, the health of the sheep is less in danger, and there will be less waste from the food being in a more convenient powdery form, so as to be wholly eaten up.

Whether the practice of confining the sheep in yards, in fattening them on this food, be the most proper and beneficial or not, has by no means been well decided; but it appears to be less natural than that of their being at large in the pastures, where they can be easily fed with it in any of its states in such troughs as have been already noticed. Sheep seem, in most cases, to get on better in the state of liberty than that of confinement, which subjects them to many inconveniences, and operates greatly against them in several ways, so as apparently to retard the feeding process. The great and material object is the manure which is thus capable of being raised; which is said to be very large in quantity, where proper care is taken in preparing such yards by litter and other matters. But the sheep is not by any means an animal calculated for raising manure from by littering; as even the resting upon it is believed by many to be greatly hurtful to it. Consequently, the injury done to sheep in this way may often be a great deal more than the value of the material which is produced; which ought, of course, to be always well considered. Besides, it should be remembered, that in the other method, the land will have the benefit wherever the feeding is carried on, though it may not always answer the views of the farmer so well. This food can certainly, however, only be made use of in fattening sheep, where it is capable of being raised in a ready manner, and in great abundance, from the nature of the soil, the situation, and other circumstances, as the quantity of it eaten by a sheep in the day will constantly be worth two-pence or three-pence, taking it at the cheapest rate.

There are other roots, as those of the carrot, and some other similar kinds, that might be tried in this way, where they can be raised in a ready and plentiful manner, as they are found to be of a very fattening quality in other cases, and capable of ready and easy application to the purpose of sheep-feeding.

OIL, OR LINSEED-CAKE, IN FATTENING SHEEP.

This is a substance which has long been found greatly useful as a food in winter fattening of sheep, and with which they require

little grass, when thus fed in the pastures. It is given in the state of powder, in the quantity of from a pound and a half to two pounds in the day for each sheep. But some managers regulate it by the quantity of half a cake, according as the sheep have more or less of other keep. The best manner of giving it, as well as all other such powdery sorts of food, is by depositing it in proper troughs divided along the middle, so that the sheep may feed on both sides of them, sloping ridge-formed coverings being placed over the whole, to keep the heads and necks of them dry while feeding, as wetness does much injury to the sheep and spoils the cake, or other such mealy matters. These roofs may be easily formed into neat small racks for hay, and prove very convenient for holding that material, and preventing its waste. They should have wheels underneath the whole, so as to be always moveable, and at the same time so constructed as to be secure and steady. By such means the sheep will be best accommodated, the food be eaten with the least loss, and the fattening be advanced in the most perfect and expeditious manner.

This is a sort of food which has been found, in some cases, to answer well in fattening young wethers and barren ewes, rendering them in a fit state to go off early, and allow another return; making them fully fat, and affording great improvement to the pastures. Some poor pasture lands have been known to become capable of fattening animals by being fed on with this substance, and others to be greatly bettered by it, merely from a single feeding with it. The cost of such food being about two-pence the pound, and a sheep consuming from a pound and a half to two pounds in the day, will, however render it too expensive a material, except in particular cases and views in the fattening of sheep.

CORN, PURE AND IN THE STRAW, FOR SHEEP.

Grain of the oat and other kinds, in the pure and sheaf states, have been tried and found useful in the winter feeding of sheep; but the expense, in general, is so considerable, that they cannot be had recourse to with advantage, except when very cheap. Sheep, on the average, consume rather more than a quart of such food in the day each, in the fattening practice. It is best given in the above trough manner when used in the pure state, but when given in the straw it is sometimes placed in the racks. It operates powerfully as a fattening food in such cases, and affords good proof, as well as fine-flavoured mutton. The pastures where sheep are fed with it are found to be much improved. The cost of this sort of food for each sheep, from the quantity which is eaten, will be about from two-pence to three-pence in the day.

BARLEY AND OTHER MEALS, AS FATTENING SHEEP FOOD.

The meal of most sorts of grain, as well as those of the pea and bean kinds, have been occasionally made use of in the winter fattening of sheep, with much effect and benefit, but the cost of such articles is in general much too high to render them applicable in the practice. It is not improbable, that linseed meal might be employed in the same way with advantage, and be at the same time more cheap than oil-cake. The use of barley-meal with pasture grass or other green food, is found highly serviceable in fattening wethers, as rendering them quickly in that state, and producing excellent mutton. All these matters are usually given in troughs, as above described.

Grey peas and beans, in the unreduced state, have likewise been employed with excellent effect in this practice, as to the fattening and mutton, when given in the same way.

The consumption of a sheep in the day, with the meal of different sorts of grain, will be about a pound and a half, which will in general cost from two-pence-halfpenny to three-pence. With the pea and bean meal, and these substances in the unbroken state, the consumption of the sheep in the day will be rather less, probably about a pound, and in some cases the cost may be a little less than mentioned above.

BRAN, AS SHEEP FOOD.

Substances of this kind are generally used as assistants in sheep-feeding, being daily given in rather large supplies with other more fattening matters. Their great utility is that of preventing any bad effects, that may take place in the process, and of giving the necessary degree of fulness to the sheep, in order to their properly feeding, which purposes they are found to answer very well. They are placed in the troughs, for the sheep to take as they may be disposed. The cost of them is commonly moderate, in proportion to the grain from which they are produced.

HAY, IN SHEEP FEEDING.

It is the practice with many, to give hay, in the cut or uncut state, to the fattening sheep in winter, which is believed to be greatly beneficial in forwarding their improvement; but some feeders suppose it to be wholly useless, if not injurious. It would seem, however, to be a necessary assistant in the practice with turnips and other juicy roots and crops, as tending to correct any bad effects that might be produced by them.

The consumption of this sort of material in this kind of feeding is not very great, being at the utmost from about three to four or five pounds daily by each sheep; but they often do not eat more than half a pound during the day. When given in the cut state, it is usually put in the troughs; but when eaten in the long state, it is better placed in the racks. Hay, for such uses, should always be of a good quality.

CUT-CHAFF FOR SHEEP.

This is another material which is occasionally given to sheep in their winter fattening, with other kinds of rich juicy food, as serving to correct them, and give the requisite distention to the stomach. It is employed in this manner in rather large proportions, being put fresh in the troughs every day or oftener as there may be a necessity.

CERTAIN OTHER HIGHLY-FATTENING MATTERS.

No matters of the sweet feeding kinds have ever yet been employed in the fattening of sheep; if the cost of such substances would, however, allow them to be used, there can scarcely be a doubt but that they would be found to answer the purpose in a very ready and effectual manner; and they might be given with much facility and convenience, by having them mixed in small suitable proportions with several of the different substances that have been already mentioned, and placing them in the feeding-troughs of the sheep. A great variety of different matters of this nature are capable of being tried in this way, but coarse sugar and malted powdery materials would seem to be the most ready and eligible for the purpose. The expense will, however, most probably prevent any such attempts from being generally made, but it would be useful to have the effects of such matters upon sheep fully ascertained.

GREEN SHEEP-FEEDING CROPS.

Many such crops have been occasionally employed in the fattening of sheep in the winter and other seasons; but there are only a few which answer well in the business at the former periods, and they are principally the following:

CABBAGES FOR SHEEP.

These form a most excellent winter fattening food for such animals, and are fully as convenient in their application for that purpose as turnips. Therefore, when such crops can be raised on the more stiff clayey sorts of land, so as to afford a sufficient weight, as from sixteen to twenty pounds on each square yard, they would be found to be greatly beneficial, and probably more to be depended on than any other with such intentions. The eating them off upon the land where they grow, and in their full, juicy, and most nutritious state, would certainly be the most proper and useful method for getting the sheep forward in their fattening; but from the great waste which is often made in this way of feeding them off, it is, in many cases, more advantageons to have them removed, and consumed on some other proper portion of pasture or other ground which is convenient for the purpose. They also answer well in the feeding of the sheep, and as they are easier removed in this method than turnips, the cost of having them removed is not very great. In their feeding quality they have much advantage over the turnip. They are, consequently, a crop that should be more generally brought into use in this sort of sheep-feeding than has yet been the case in such management.

RAPE, OR COLE, IN SHEEP-FEEDING.

As the spring approaches, or in the very early part of it, this is a crop which may be ready, and be applied in the fattening of sheep with much benefit, as possessing great power in that way. It succeeds well to the turnip crops in such application, but may be produced earlier, if wanted, by proper care in raising it. Though in quantity of produce on any certain extent of land it may fall short of both the turnip and cabbage crops, yet, in point of fattening quality, and as being relished by the sheep, it is probably not surpassed by any plant whatever. It is found to be much superior to the first of the above crops for this use; but that which is grown on fresh land, and has the stem quite brittle, is much the best, being on long-tilled land tough and wiry, with but small proof. It is probably the best, in this practice, to feed it off upon the land, in proper divisions, as in the case of turnips, though there may be some little waste. It will perhaps fatten fewer sheep on the acre than turnips, but it does it in less time, and is raised at much less expense. It is, consequently, a crop which should always be well attended to in this sort of sheep management.

The cost of this kind of food, in the day, for each sheep, will be somewhat under one penny, where the crops are well raised and managed. It is, therefore, in this application, a very cheap sort of sheep food.

TARES IN SHEEP FEEDING.

This is a sheep-feeding crop which comes in well after several of the others have been eaten off, and thus affording a seasonable supply of food to proceed with in completing the fattening process. Some managers think them a very feeding sort of keep, while others have but little opinion of them in such application. As they are of the pulse kind, there can, however, be no doubt, but that they must have a considerable fattening property, when used in a suitable manner.

In feeding such crops off with this intention, it is advisable to wait until the plants have gained a good increase of stem, before they are given to the sheep, and then to let the ground be hurdled off, or divided in portions, as mentioned below. Some feeders are, however, in the practice of letting the sheep eat them off on the land, in very small divisions or spaces at a time, so as to be very closely crowded together, by which means there is much waste in their being trodden into the ground, and great injury is done to both the land and the sheep. It is a good practice to clear a suitable proportion of the crop, by removing the produce to the stables or other places, and then to hurdle or divide it off from the growing tares, putting the sheep into the cleared portion, and feeding them with the fresh-cut plants in racks, which are daily to be moved forward to the edge of the growing crop; by which method there will be little waste, while the sheep aud the land will be benefited in the highest possible degree. Another excellent practice, often had recourse to in the western sheep districts, is, that of feeding them through rack hurdles, made in the same manner as the usual five-railed ones, but leaving the middle rail out, and nailing upright pieces of long, thin, narrow deals, crosswise of them, at suitable distances, so as to allow of the sheep putting their heads through them to get at the food. A swath of the tares is then mown in the morning, in the proper direction, and the requisite number of these hurdles, allowing one to every four or five sheep, are set down close by it: at noon, another swath is mown and thrown to the hurdles, and the same at night: next morning, after a swath has been mown, the hurdles are again set down: in this manner moving them once in the twenty-four hours; by which means, with the little additional trouble thus occasioned, the tare crops are eaten clean off, and the land, as well as the sheep, the most equally and the most fully improved and brought forward.

In these economical modes of feeding off tare crops, each sheep will probably require not more space of crop than about four or five yards square to be cleared in the day, as the waste will be very trifling where the crops are in the proper states for being so applied.

There are some other sorts of green crops, that seem capable of being cultivated and applied in this way with advantage, as possessing highly fattening qualities, but they have not yet been sufficiently tried in sheep-feeding to warrant their being particularly recommended.

Section XII.—*Profits in the different Practices of fattening Sheep.*

These vary materially, according to their nature and kinds, and are affected by many different circumstances and causes, so as to be scarcely ever the same in any two cases of even the same nature.

IN PASTURE FEEDING

It should be the constant aim and endeavour of the store-master, in every kind of grass-feeding with sheep, to have his grazing lands as fully provided as possible with proper quantities of stock, as otherwise great individual loss is sustained, and the community suffer much injury in consequence of a less number of sheep being fattened than might have been. The same must likewise be the case, where improper modes of practice are pursued and persevered in, which practice, when found to be unfit for the purpose, should always be relin-

quished, and such others substituted as afford more full and ample profits. No one practice can always be equally productive of benefit, however good and well suited it may be, on account of the differences caused by the fluctuation in the prices of lean stock of this sort in different cases and circumstances, the ease or difficulty of procuring it at different times, and the influence of good or bad seasons on the productiveness of keep.

The practices in sheep-fattening are also liable to vary greatly, even in the same situations and circumstances; store-masters being necessarily regulated and directed in their habits and practices of feeding sheep by the circumstances of the times and the nature of the seasons; so as to have their fattening pastures stocked in proportion to the state of the feed on them, but always taking good care to have them well supplied in the latter spring and more early summer months. The profits in this management are likewise greatly influenced by particular local causes, as well as by the extent of capital.

Wholly stocking with sheep, where the keep is constantly preserved in a suitable state, and where stock can in all seasons and cases be readily obtained, in the lean condition, at a suitable price, is perhaps the most beneficial practice of any. In the richer sorts of pasture, there will be much difference in the profits, in consequence of the quantity of stock any certain portion of land is made to carry; as by improved and well-managed methods, a much larger proportion may be kept than where the contrary is the case, and yet the animals will get equally well or better forward. Those in common make the most ample profits, who have the most suitable supplies ready at all times to put on to the lands as the others go off, and who pay the most attention to their nature and properties. Less profit will arise sometimes from an extension of the fattening process; as when pushed farther than is necessary, there must be loss both to the individual and the community. The kinds, sizes, and dispositions of the sheep, as to fattening, will also make much difference, as the returns will be more or less quick, and better or worse markets will follow. The selling the fattened sheep as soon as ready, or keeping them afterwards, must also create much difference in the profits; and, in general, the best method is to dispose of them at once. In most cases, the more returns there are made in the year, and the greater the profits, especially where the practices followed are suitable to the various districts and places, as well as other purposes.

It is never a safe practice in fattening sheep, to turn those which are in the lean state at first directly on the rich feeding pastures, as they should be continued some time on those of the inferior sorts, by which the risk of injury will be much avoided. Sheep that are in the half-fat state may, however, be immediately put on good pastures, without any apprehension of mischief, and be often completed in the fattening in a short time, by which method another return may soon be had, and the profits be much increased.

Many other matters affect the profits in the pasture-feeding of sheep; but very much depends upon the extent and the quality of the fattening pastures compared with the other lands of the sheep-master, on the knowledge and judgmeut in procuring lean stock for the purpose, on the kind of season, the markets, the accidental losses, and the general expense of conducting the business.

Some feeders, in this sort of fattening, make use of a piece of fine grass-land of superior richness, for finishing the sheep out upon, by

which more sheep are capable of being completed and returned, than if the full amount of stock was regularly kept on the different grounds, and the inferior pasture-lands were stocked more closely, the more quick-feeding sheep being taken into the finishing piece as they come forward.

Various statements and trials of this nature, with different sorts of sheep and keep, are given below, in the view of affording a more full elucidation of the subject, and rendering it still more plain and easier to be understood.

FEEDING WITH ROOTS, DRY MATTERS, AND JUICY VEGETABLES.

The profits in this method, or the winter fattening of sheep, must, it is evident, greatly differ in proportion to the facility or difficulty there may be in the providing such food, the manner of conducting the feeding, and the sorts of sheep which are made use of in the practice. Where the cheaper sorts of such fattening food can be conveniently and plentifully supplied in the most suitable states for the purpose, there can be no doubt, but that the profits will be a great deal higher than under the contrary circumstances. Profits may likewise differ from many other causes and circumstances of a local nature; but that great advantages must often be gained by the practice, is sufficiently shown by its general use in so many places and by so many sheep-masters.

INCREASE IN FEEDING.

The daily increase is considerable in some sort of sheep on some kinds of keep; but on turnips this increase is often, not to any great extent. It is accurately shown in the trials, the results of which are accurately given below About the beginning of autumn, ten Norfolk, ten Leicestershire, and ten South Down wether hoggit lambs were put to turnips, that they might learn to eat them readily, and they were kept together until the 6th of November; when the ten Leicestershire, the ten South Down and nine of the Norfolk (one having died), were numbered, weighed, and put each sort by themselves, into three pieces of wheat stubble, of one acre each, which were separated by hurdles: and there were provided, at the same time, three other pieces of the like size, and separated in the same manner, to shift them into. They were fed upon turnips, topped and tailed, measured to them in bushel skeps, with great exactness, from that time until the 14th of March, and then weighed.

NEW LEICESTER.

WEIGHT OF EACH SHEEP, November 6,				WEIGHT OF EACH SHEEP, March 14,			
No.	*Stone.*	*Lbs.*	*Ozs.*	*No.*	*Stone.*	*Lbs.*	*Ozs.*
1	4	13	4	1	7	0	8
2	5	4	4	2	6	9	0
3	5	5	0	3	7	7	8
4	5	7	8	4	6	12	8
5	5	8	0	5	6	12	0
6	5	9	0	6	7	6	0
7	5	10	4	7	7	2	8
8	6	0	0	8	7	9	0
9	6	2	8	9	7	8	8
10	6	4	0	10	8	1	0
Average weight, the 6th of November, about 5st. 9lb. 3oz. each.				Average weight, the 14th of March, about 7st. 14lb. 2oz. each.			

Average increase of weight, in eighteen weeks, two days, about 1st. 8lb. 14oz. each.

SOUTH DOWN.

WEIGHT OF EACH SHEEP, November 6.				WEIGHT OF EACH SHEEP, March 14,			
No.	*Stone.*	*Lbs.*	*Oz.*	*No.*	*Stone.*	*Lbs.*	*Oz.*
1	4	13	0	1	6	13	12
2	5	0	0	2	6	11	8
3	5	1	8	3	6	13	8
4	5	2	12	4	7	2	0
5	5	4	12	5	6	9	4
6	5	5	12	6	6	12	0
7	5	7	0	7	7	2	0
8	5	7	0	8	6	10	8
9	5	7	4	9	7	3	8
10	5	8	8	10	7	0	8
Average weight, the 6th of November, about 5st. 4lb. 5½oz. each.				Average weight, the 14th of March, about 6st. 12lb. 7oz. each.			

Average increase of weight, in eighteen weeks two days, about 1st. 8lb. 1½oz. each.

NORFOLK.

WEIGHT OF EACH SHEEP, November 6,				WEIGHT OF EACH SHEEP. March 14,			
No.	*Stone.*	*Lbs.*	*Oz.*	*No.*	*Stone.*	*Lbs.*	*Ozs.*
1	6	4	8	1	8	2	0
2	6	6	0	2	7	10	8
3	6	6	4	3	7	4	0
4	6	6	8	4	7	5	8
5	6	7	0	5	7	11	8
6	6	8	12	6	7	9	0
7	6	11	8	7	8	2	0
8	6	12	8	8	8	0	0
9	7	2	0	9	8	9	8
Average weight the 6th of November, about 6st. 8lb. 9oz. each.				Average weight, the 14th of March, about 7st. 12lb. 4oz. each.			

Average increase of weight, in eighteen weeks two days, about 1st. 3lb. 11oz. each.

QUANTITY EATEN IN EIGHTEEN WEEKS TWO DAYS.

The ten Leicestershire ate	588	bushels of turnips.
The ten South Down ate .	589	bushels of turnips.
The nine Norfolks ate . .	607	bushels of turnips.

The offal turnips were, at different times, collected, measured, and deducted from the account of the quantities given to them.

It is evident, that if nine Norfolks consumed 607 bushels, ten would, in the same proportion, have consumed above 674 bushels, or 85 bushels more than the South Down, and 86 bushels more than the Leicesters.

The Norfolk and South Down were about the same age, Leicesters about six weeks younger. It should be observed, that they were both times weighed, after having stood some time in pens to empty themselves. The Leicesters and Norfolks were bred by Mr. Coke, of Holkham; the South Down by Mr. Ellman, of Glynd; and as they were all picked out for the purpose, there can be no doubt they were prime stock of their kinds. The Norfolks were chosen out of about seven hundred lambs, the Leicesters and South Downs out of about one hundred each.

Another very interesting trial, with four different breeds of sheep, was made by the direction of the late Duke of Bedford. For this purpose twenty South Downs, bred on the farm at Woburn, from sheep procured on the South Downs, were selected, and an equal number of Leicesters from Leicestershire, also of Worcestershires and Wiltshires, from their different counties were procured; great care being taken to have good stock of the same age of the respective kinds. At the commencement of the experiments, the Leicesters were fat, the South Downs in good order, and the Worcestershires and Wiltshires lean.

And to render the food consumed, as well in summer as winter, a part of the trial, sixteen acres in the park were hurdled off into four divisions; the soil and herbage as equal as could be fixed upon.

The trial began November 19, 1794, when twenty of each sort were put into four acres, and continued there till killed, except for nineteen days, when the several pastures being too bare, they were drawn off, for that time, to refresh the bite.

November 19, 1794, Weights of Eighty Lambs, after fasting Eighteen Hours.

NO.	SOUTH DOWN.		LEICESTER SHIRE.		WORCESTER SHIRE.		WILTSHIRE.	
	lbs.	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*
1	98	8	97	0	97	0	113	0
2	92	0	106	8	87	8	95	0
3	89	8	101	0	87	8	113	8
4	93	0	95	8	90	0	102	8
5	93	0	89	8	88	0	125	0
6	102	0	97	0	94	0	133	8
7	94	0	92	8	100	0	112	0
8	99	0	98	8	85	8	108	0
9	103	8	102	8	91	8	97	0
10	99	0	100	0	89	8	105	0
11	99	0	109	8	90	8	102	0
12	97	0	80	8	94	0	107	8
13	98	0	93	0	91	8	109	8
14	91	0	99	0	95	8	104	8
15	94	0	88	8	91	0	100	8
16	92	8	105	0	93	8	105	8
17	101	8	98	0	104	8	110	8
18	101	8	87	0	85	8	98	0
19	95	0	104	8	95	0	108	8
20	100	8	109	0	104	0	113	0
	1933	8	1954	0	1855	8	2163	8
Aver.	96	0	97	0	92	0	108	0

They were put to turnips, strewed on the grass of each division, till February 24, 1795; when, on being weighed, the result was as below.

February 25, Seventy-six Sheep weighed.

NO.	SOUTH DOWN.		LEICESTER SHIRE.		WORCESTER SHIRE.		WILTSHIRE.	
	lbs.	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*
1	83	3	83	4	77	12	99	0
2	80	12	88	2	78	0	86	0
3	71	8	89	4	81	8	94	0
4	79	10	85	4	89	8	80	0
5	84	0	78	4	87	0	101	8
6	97	8	88	0	91	12	122	0
7	94	6	82	10	87	0	87	0
8	91	8	86	0	75	8	93	8
9	94	12	92	4	74	10	88	0
10	89	12	85	0	82	8	101	4
11	93	6	97	12	85	8	91	0
12	92	14	67	4	82	12	101	4
13	86	0	77	4	89	0	95	8
14	77	4	82	0	78	0	90	6
15	90	8	72	8	83	0	87	12
16	80	10	86	12	74	12	89	4
17	83	0	82	0	91	8		
18	89	0	73	12	76	8		
19	83	8	90	12	86	10		
20	91	12	97	0	81	4		
	1739	3	1685	0	1654	0	1508	6

Only sixteen Wiltshires were now weighed, as it was found that that number of them ate in proportion to twenty of the others.

The consumption of turnips between December 4, 1794, and February 24, 1795, was as below with the different sorts.

	lb.
South Downs	10,945
Leicesters	11,500
Worcesters	11,498
Wiltshires	11,518

All the four lots 120*lb.* of hay each.

		WEIGHT. *lb.* *oz.*
20 South Downs . . .	Nov. 19	1933 8
	Feb. 25	1739 3
	Lost	194 5
20 Leicesters	Nov. 19	1954 0
	Feb. 25	1685 0
	Lost	269 0
20 Worcesters	Nov. 19	1855 8
	Feb. 25	1654 0
	Lost	201 8
16 Wiltshires (to No. 16)	Nov. 19	1733 8
		1508 6
	Lost	225 2

Of course, the South Downs did better than any of them.

It is to be noted, that in this experiment the loss of weight by feeding on turnips is remarkable, though the mode of feeding them by drawing is supposed the best, in so far as the stock is concerned.

LOSS IN EACH SORT.

	lb.	*oz.*
The South Downs	194	5
The Leicesters	269	0
The Worcesters	201	8
The Wiltshires	225	2
76 Sheep lost	889	15
Call it	890	0
Which is per head . .	11	12

Which, dead, would be of mutton, it is said, above 6lb.; and at 5*d.* per lb., 2*s.* 6*d.*; which, for fourteen weeks, the time they were at turnips, is 2*d.* per week and a fraction. It is noted, that throughout the trial, mutton is reckoned at 5*d.* per lb. But that it is a matter of perfect indifference what the price is, provided it be

the same for all, the comparison of the breeds being the principal object, the real price, owing to the scarcity, was when sold, much higher; but as 5*d.* per lb. is more common, and perhaps above the average of the kingdom for years together, the trial may be more generally useful, by supposing a price nearer a general one, than the particular ratio of the time.

The sheep consequently lost, it is supposed, nearly as much as is given for keeping hoggits on turnips; when they are plentiful, they may be kept for 3*d.* per week; but on an average of crops, drawn and given on the grass, as these were, 3½*d.* or 4*d.* would be given; to which add 2*d.* and a fraction less, and the account shows what sort of food turnips often prove in sheep-feeding.

From this time they were turned to turnips, &c., with the store-stock, and, April 9th, to pasture, the paddocks not being forward enough to receive them till May 13, when they were weighed again.

May 13, 1795, Seventy-six Sheep weighed.

NO.	SOUTH DOWN.		LEICESTER SHIRE.		WORCESTER SHIRE.		WILTSHIRE.	
	lb.	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*
1	94	4	82	0	86	10	107	8
2	83	0	71	0	86	12	105	0
3	82	8	86	4	85	4	96	12
4	87	6	88	4	97	4	97	0
5	86	8	80	12	95	12	99	0
6	103	12	86	8	90	0	92	0
7	96	12	85	12	97	8	132	4
8	101	12	81	12	94	4	106	0
9	101	0	86	12	82	14	109	0
10	90	4	88	0	89	8	107	8
11	98	8	95	12	92	8	103	0
12	101	0	80	0	87	0	100	2
13	92	4	83	8	98	10	96	8
14	83	4	84	8	93	6	96	10
15	87	4	77	8	86	0	110	8
16	91	6	91	6	76	12	132	0
17	89	2	84	0	107	12		
18	96	0	99	0	80	8		
19	92	12	81	0	96	12		
20	104	4	97	8	102	8		
	1862	14	1711	2	1827	8	1690	12

		WEIGHT. *lb.* *oz.*
23 South Downs	May 13	1862 14
	Feb. 25	1739 3
	Gain	123 11
20 Leicesters	May 13	1711 2
	Feb. 25	1685 0
	Gain	26 2
20 Worcesters	May 13	1827 8
	Feb. 25	1654 0
	Gain	173 8
16 Wiltshires	May 13	1690 12
	Feb. 25	1508 6
	Gain	182 6

Consequently, in this first putting to grass, the Leicesters did the worst, and the Wiltshires the best.

	lb.	*oz.*
Gain by 20 South Downs	123	11
—— 20 Leicesters	26	2
—— 20 Worcesters	173	8
—— 16 Wiltshires	182	6
	505	11

Which is per head 6½*d* per lb., or, dead weight, 3½*d.* per lb., and at 5*d.* per lb. is 1*s.* 5½*d.*, which for six weeks and a half, is per week nearly 2½*d.*

Reduced, therefore, as they were, by turnips, it is observed, that they gained more per week by the grass than they had lost per week on that root, yet that the gain was small, unless the weather was cold and raw.

July 3, weighed again :—

1795, July 3, Seventy-six Sheep and their Wool weighed, after being shorn,

	SOUTH DOWN.				LEICESTERSHIRE.				WORCESTERSHIRE.				WILTSHIRE.			
NO.	SHEEP.		WOOL.		SHEEP.		WOOL.		SHEEP.		WOOL.		SHEEP.		WOOL.	
	lb.	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*	*lb.*	*oz.*
1	108	4	4	11	91	0	7	1	104	12	6	9	126	8	4	12
2	101	0	4	10	85	0	4	0	96	4	6	0	119	8	5	2
3	89	8	4	10	96	0	7	8	86	12	6	10	120	4	3	15
4	99	0	3	12	91	0	5	14	111	12	7	0	113	8	4	15
5	105	4	4	10	97	4	7	4	109	0	8	1	117	6	5	0
6	115	0	5	6	96	0	6	7	111	2	6	14	106	10	4	6
7	104	12	5	11	98	4	6	4	112	12	6	2	146	4	5	1
8	110	12	6	6	96	0	6	8	107	12	6	12	121	8	5	2
9	113	10	5	0	101	6	5	8	97	2	6	8	115	10	5	0
10	105	4	5	8	100	6	7	7	101	0	6	0	122	8	6	10
11	115	4	4	12	119	2	6	7	103	6	6	13	120	0	0	0
12	114	0	4	3	90	8	6	6	97	12	6	13	118	0	5	15
13	101	4	5	1	91	0	5	2	98	2	8	3	113	4	5	14
14	95	0	4	8	95	0	7	0	106	0	6	6	113	12	5	3
15	96	8	6	0	84	0	6	4	115	0	6	7	129	0	5	6
16	108	8	3	15	98	6	7	4	98	10	6	0	151	0	5	12
17	106	10	4	0	94	8	7	11	116	0	9	5				
18	107	8	4	4	105	2	6	4	95	12	4	15				
19	102	0	4	10	90	10	7	10	105	0	8	0				
20	119	0	3	4	114	12	7	6	110	0	8	2				
	2118	0	94	13	1934	4	131	3	2083	14	137	8	1954	10	82	1

	WEIGHT. *lb.* *oz.*
20 South Downs	2118 0
Their wool	94 13
	2212 13
20 Leicesters	1934 4
Their wool	131 3
	2065 7
20 Worcesters	2083 14
Their wool	137 8
	2221 6
16 Wiltshires	1954 10
Their wool	82 1
	2036 11

		WEIGHT. *lb.* *oz.*
20 South Downs,	July 3	2212 13
	May 13	1862 14
	Gain	349 15
20 Leicesters	July 3	2065 7
	May 13	1711 2
	Gain	354 5
20 Worcesters	July 3	2221 6
	May 13	1827 8
	Gain	393 14
16 Wiltshires	July 3	2036 11
	May 13	1690 12
	Gain	345 15

October 15, summer food finished, and turnips began to be given. Weighed again:

1795, October 15, Seventy-six sheep weighed, and put to turnips.

No.	SOUTH DOWN.		LEICESTER SHIRE.		WORCESTER SHIRE.		WILTSHIRE.	
	lbs.	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*
1	135	0	120	2	128	8	153	0
2	120	0	106	0	133	0	148	8
3	110	0	122	8	118	0	145	8
4	119	12	127	0	144	0	144	0
5	128	4	126	8	137	8	146	0
6	134	0	122	10	145	0	130	8
7	129	0	129	8	143	0	172	0
8	130	4	118	8	143	4	157	0
9	137	0	133	0	127	12	143	8
10	128	8	126	0	133	0	153	0
11	137	4	141	12	128	8	147	0
12	138	4	118	0	124	0	149	12
13	125	8	118	12	127	8	147	0
14	118	4	127	8	139	0	141	8
15	122	0	110	4	150	0	160	0
16	129	0	124	4	123	4	180	0
17	133	0	131	8	153	0		
18	135	8	135	8	132	0		
19	122	0	117	8	138	0		
20	140	2	146	8	149	8		
	2572	10	2505	4	2717	12	2418	4

		WEIGHT. *lbs.*	*oz.*
20 South Downs,	October 15,	2572	10
	July 3,	2212	13
	Gain,	359	13
20 Leicesters,	October 15,	2505	4
	July 3,	2065	7
	Gain,	439	13
20 Worcesters,	October 15,	2717	12
	July 3,	2221	6
	Gain,	496	6
16 Wiltshires,	October 15,	2418	4
	July 3,	2036	11
	Gain,	381	9

The Worcesters through the summer, therefore, did very well.

The following statement will shew the gain on grass, from leaving off turnips in the spring, to putting again to turnips in the autumn:

		WEIGHT. *lbs.*	*oz.*
20 South Downs,	October 15,	2572	10
	February 25,	1739	3
	Gain,	833	7

Suppose the proportion of the dead to the live weight to be as 12 to 20; this is dead 499lbs., and at 5*d.* per lb., is 10*l.* 8*s.* per head, 10*s.* $4\frac{3}{4}$*d.* per head per week, for thirty-three weeks, $3\frac{3}{4}$*d.*

		WEIGHT. *lbs.*	*oz.*
20 Leicesters,	October 15,	2505	4
	Feb. 25,	1685	0
	Gain,	120	4

This is dead 637lbs., and at 5*d.* per lb. is 13*l.* 5*s.*, 5*d*, per head, 13*s.* 3*d.*, per head per week, $4\frac{3}{4}$*d.* and a fraction.

		WEIGHT. *lbs.*	*oz.*
16 Wiltshires,	October 15,	2418	4
	Feb. 25,	1508	6
	Gain,	909	14

This is dead 544lbs., and at 5*d.* per lb. 11*l.* 6*s.* 8*d.* per head; 14*s.* 2*d.* per head, per week, more than 5*d.*

It is remarked, in recapitulation, that South Downs, weighing each 86lbs. on an average, February 25, pay per week $3\frac{3}{4}$*d.*

Leicesters, weighing on an average each 84lbs., February 25, pay per week $3\frac{3}{4}$*d.*

Worcesters, weighing on an average 82lb., pay per week $4\frac{3}{4}$*d.*

Wiltshires, weighing on an average 75lbs., pay per week 5*d.*

For the three first, the experiment is fair; but no conclusion is to be drawn from the Wiltshires, for as sixteen had the same food as twenty of the others, the superiority here indicated is without meaning.

Leicester and South Down equal; Worcester superior.

Being thus put to turnips a second time, they continued to be so fed till February 16, when they were sent to market, being first weighed.

Seventy-six Sheep weighed 16th February, 1796, and sent to market.

NO.	SOUTH DOWN.		LEICESTERS.		WORCESTERS.		WILTSHIRES.	
	lbs.	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*	*lbs.*	*oz.*
1	132	0	136	8	137	8	170	0
2	124	0	112	4	137	0	156	8
3	121	0	131	8	118	8	147	12
4	133	0	146	12	147	0	148	0
5	144	0	131	0	145	0	156	0
6	140	0	128	8	164	0	149	0
7	144	8	143	8	148	0	176	0
8	132	6	132	8	151	0	175	0
9	143	12	143	4	120	4	148	0
10	134	0	140	4	142	2	162	8
11	141	2	148	4	140	8	158	2
12	155	8	133	0	125	0	158	0
13	131	0	144	8	133	0	154	0
14	125	0	134	0	145	0	152	0
15	127	8	145	0	166	4	172	0
16	134	0	131	0	132	8	189	0
17	140	0	151	12	159	0		
18	141	0	157	0	136	0		
19	132	0	126	11	155	0		
20	155	0	152	0	161	0		
	2734	12	2769	4	2863	10	2571	14

	WEIGHT. *lbs.*	*oz.*
20 South Downs, Feb. 16, 1796,	2734	12
Oct. 15,	2572	10
Gain,	162	2

This is dead 97lbs., and at *5d.* per lb. is *2l. 0s. 5d.* per head; $2\frac{1}{4}d.$ per head per week, for eighteen weeks, $1\frac{1}{4}d.$

20 Leicesters, Feb. 16, . . .	2769	4
Oct. 15, . . .	2505	4
Gain, . .	264	0

This is dead 158lbs., and at *5d.* per lb., is *3l. 5s. 10d.* per head, *3s.* $3\frac{1}{2}d.$ per week, something less than $2\frac{1}{4}d.$

20 Worcesters, Feb. 16, . . .	2863	10
Oct. 15, . . .	2717	12
Gain, . .	145	14

This is dead 86lbs., and at *5d.* per pound, is *1l. 15s. 10d.*, per head, *1s.* $9\frac{1}{2}d.$; per head, per week, *1d.*

16 Wiltshires, Feb. 16, . . .	2571	14
Oct. 15, . . .	2418	4
Gain, . .	153	10

This is dead 91lbs., and at *5d.* per pound, is *1l. 18s. 0d.*; per head, *2s.* $4\frac{1}{2}d.$; per head, per week, $1\frac{1}{2}d.$

	d.
South Downs, per week, ...	$1\frac{1}{4}$
Leicesters, ...	$2\frac{1}{4}$
Worcesters, ...	1
Wiltshires, ...	$1\frac{1}{2}$

In respect to all the calculations per week of what was paid by the sheep, it is stated only for the sake of comparison; there is an additional return by lean flesh at a lean price, being converted into a saleable price, which adds considerably; but this is equal to all in proportion to their weight.

In regard to the consumption of turnips, they were, it is observed, weighed from October 19, 1795, to February 14, 1796, as they were given to the sheep, and the remnants not eaten also were weighed and deducted. The following is the result:

	lbs.
South Downs.—Given, ...	54,036
Taken away, . .	1,812
Eaten, ...	52,224
Leicesters,—Given, ...	54,036
Taken away, . . .	2,001
Eaten, ...	52,035
Worcesters.—Given, ...	54,036
Taken away, . . .	1,361
Eaten, ...	52,675
Wiltshires.—Given, ...	54,036
Taken away, . . .	1,189
Eaten, ...	52,847

	HAY. *lbs.*
South Downs, ...	64
Leicesters, ...	54
Worcesters, ...	68
Wiltshires, ...	76
	252

It is observed, that the difference of the number of Wiltshires excepted, their stomachs were on a par.

But there is still one other comparison to

make, and that is, their increase from the first to the last, including in one account the turnips of both winters and the grass.

	WEIGHT. lbs.
20 South Downs, Feb. 16, 1796, . .	2734
Nov. 19, 1794, . .	1933
Gain, .	801

Which is dead 480lbs., and at 5*d.* per lb., is 10*l.*; per head, 10*s.*; per head, per week, for sixty-four weeks, under 2*d.*

20 Leicesters, Feb. 16, 1796, . . .	2769
Nov. 19, 1794, . . .	1954
Gain, .	815

Which is dead 488lbs., and at 5*d.* per lb., is 10*l.* 3*s.* 4*d.*; per head, 10*s.* 2*d.*; per head, per week, for sixty-four weeks, under 2*d.*

20 Worcesters, Feb. 16, 1796, . .	2863
Nov. 19, 1794, . .	1855
Gain, .	1008

Which is dead 604lbs., and at 5*d.* per lb., is 12*l.* 11*s.* 8*d.*; per head, 12*s.* 7*d.*; per head, per week, more than 2¼*d.*

16 Wiltshires, Feb. 16, 1796, . . .	2571
Nov. 19, 1794, . .	1733
Gain, .	838

Which is dead 499lbs., and at 5*d.* per lb., is 10*l.* 8*s.*; per head, something under 13*s.*; per head, per week, more than 2¼*d.*

	d.
South Downs, per week, ...	2
Leicesters, ...	2
Worcesters, ...	2¼
Wiltshires, ...	2¼

	L.	*s.*	*d.*
South Downs, 96lbs., sold at	2	7	0
Wool, ...	0	6	2¾
	2	13	2¾
Leicesters, 97lbs.	2	10	8
Wool, ...	0	4	8
	2	15	4
Worcesters, 92lbs.	2	4	9¼
Wool, ...	0	5	1½
	2	9	10¾
Wiltshires, 108lbs.	2	6	4¾
Wool, ...	0	5	5½
	2	11	10¼

It is added, that the experiment terminated here with their being driven to Smithfield; but in order to render it yet more satisfactory, one from each lot was chosen, the second best as nearly as could be, in order for killing and weighing more particularly; and that the question of bone might not depend on any general assertions, they were ordered to be carefully kept and weighed from every joint, as eaten. The following is the result:

The weight of four of the experimental sheep, killed March 14, 1796.

LEICESTERSHIRE.	*lbs.*	*oz.*
No. 20 weighed alive	152	0
Skin	20	0
Fat	11	8
Head and pluck	9	6
Entrails . . .	11	2
Blood	6	0
Four quarters .	92	0
	150	0
Bones clean . .	5	9
Fat with the kidneys in . . .	5	1
Kidneys . . .	0	4

SOUTH DOWN.	*lbs.*	*oz.*
No. 20 weighed alive	155	0
Skin	17	8
Fat	13	2
Head and pluck	10	8
Entrails . . .	13	4
Blood	5	14
Four quarters .	92	6
	152	10
Bones clean . .	6	5¾
Fat with the kidneys in . . .	8	6
Kidneys . . .	0	4¾

WORCESTERSHIRE.	*lbs.*	*oz.*
No. 20 weighed alive	161	0
Skin	23	0
Fat	12	8
Head and pluck	12	0
Entrails . . .	15	0
Blood	8	0
Four quarters . .	89	0
	159	8
Bones clean . .	6	0
Fat with the kidneys in . . .	6	12
Kidneys . . .	0	5

WILTSHIRE.	*lbs.*	*oz.*
No. 8 weighed alive	175	0
Skin	23	0
Fat	13	8
Head and pluck	14	0
Entrails . . .	17	10
Blood	8	2
Four quarters .	97	0
	173	4
Bones clean . .	9	8
Fat with the kidneys in . . .	4	3½
Kidneys . . . *	0	5

* The waste in all the sheep is great, which the bailiff attributes to the butcher being too long a time in dressing them.

PROPORTION OF LIVE AND DEAD WEIGHT.

South Down 155, alive, giving 92, dead, is 20 giving 11¾. Leicester 152, giving 92, is 20 giving 12; Worcester 161, giving 89, is 20 giving 11; Wiltshire 171, giving 97, is 20 giving 11.

Sale of Seventy-two Sheep, at Smithfield, Feb. 22, 1796.

							L.	s.	d.
19 LEICESTERSHIRE.									
			s.	d.	L.	s.	d.		
8 Mr. Ware,	at		51	0	20	8	0		
11 Mr. Darking,	at		50	6	27	15	6		
								48	3	6
19 SOUTH DOWN.									
19 Mr. Circuit,	at		47	0				44	13	0
15 WILTSHIRE.									
7 Mr. Lomas,	at		48	0	16	16	0		
8 Mr. Stackley,	at		45	0	18	0	0		
								34	16	0
19 WORCESTERSHIRE.									
11 Mr. Brooks,	at		45	0	24	15	0		
8 Mr. Vaughan,	at		44	6	17	16	0		
								42	11	0

SECTION XI.—*Nature, Growth, Increase, and Improvement, of the fleecy Covering of Sheep.*

ALTHOUGH a knowledge of the nature of the fleecy covering of sheep, and of every circumstance connected with the growth and improvement of wool, is evidently of the utmost importance to the breeder of sheep, to the wool manufacturer, and to the public in general, it is surprising that so little attention has been bestowed upon these subjects, especially by those who are more particularly interested in the advancement of such knowledge. For it should be reçollected, that a superior quality of the fleece includes other advantages besides an increase of the pecuniary value of the wool; as from the improved fineness of its quality it becomes more close and united as a covering for the sheep; and by possessing a more abundant supply of yolky or greasy matter, affords a much better protection to them from the severity, of the weather than the more coarse, open and hairy sort of wool, which is still so prevalent among the flocks of this country.

STRUCTURE AND FORMATION.

Mr. Bakewell, the able and intelligent writer on wool, from the trials which he has made, as well as from those of others of the chemical kind, is of opinion, that the constituent nature of the parts of this substance is exactly the same as that of other animal excrescent matters, such as those of hair, horn, nails, and feathers; as whatever the external difference in them may be, they afford the same conclusions when chemically examined. Externally, the chief difference consists in the solidity of the one, and the fibrous nature of the other; in the hardness and elasticity in one case, and in the less hardness, and more pliable and yielding quality of the other. The distinction, therefore, between wool and hair is asserted to be "more artificial than natural," as in this, as well as many other cases, the convenience has given "different names to substances essentially the same," in consequence of their having been made capable, by something peculiar in them, of being artificially applied to different uses and intentions.

If the nature of wool be chemically examined, it will be found very similar in its several constituent properties to hair; and from the trials of some, as Hatchett and Achard, it would seem, that the toughness and suppleness, in the last substance, depend on the quantity of gelatine which it contains; as when hair is boiled in water, a separation of this principle takes place, and the hair is rendered much more brittle than it was before; and if the process

be continued for a sufficient length of time, it crumbles to pieces between the fingers. That part which continues to be insoluble in the water, has, it is said, by the former of these writers, the properties of coagulated albumen; and he has concluded, from his trials, that the hair which loses its curl in damp weather, and which is the softest and most flexible, is that which parts with its gelatine the most readily; while, on the contrary, strong and very elastic hair gives it out with the greatest difficulty, and in the least proportion. This conclusion has likewise been confirmed by a very large dealer in hair, who assured the experimenter, that the first kind of hair was much more injured by boiling than the latter.

In numerous trials which have been made by Vauquelin, with human hair of several colours, it has been found perfectly soluble in the digester of Papin, and during the action of which, sulphuretted hydrogen has been forced off, while the solution that has been thus gained has contained a sort of bituminous oil; that is deposited in a very slow manner. In this case. the oil was black when the hair was of that colour, but of a yellowish red, when the hair made use of in the trial was red. On the oil being removed, nut-galls and chlorine produced large precipitates. Silver became blackened, and acetate of lead afforded a brown precipitate. In the circumstances of being concentrated by evaporation, it did not concrete into a jelly-liké mass.

Water, which contains only four parts in the hundred of potass, has the property of dissolving hair, while hydro-sulphuret of ammonia is evolved or thrown off. In case the hair be black, there is a thick dark-coloured oil, with some sulphur and iron that remain undissolved. Where the hair is red, this oil is of a yellowish cast. From this solution a precipitate is thrown down by acids, which is soluble in an excess of acid.

Both the sulphuric and muriatic acids become red when first poured on hair, and they dissolve it in a gradual manner. By nitric acid it is turned yellow, and dissolved, while an oil separates, that varies in colour, as already noticed, according to the colour of the hair which is made use of. In the solution there is contained considerable portion of oxalic acid, in addition to the bitter principle, iron and sulphuric acid; chlorine reduces it to a substance, which has the consistence of turpentine, and is partly soluble in pure spirit. When alcohol is digested on black hair, it extracts from it two kinds of oil; the first of which is of a light colour, and subsides in white shining scales, as the liquid becomes cool; the latter is gained by evaporating the alcohol; has a greyish green colour, and at last becomes solid. There are also two oils extracted by alcohol from red hair, the one of which is white, as before, the other red as blood; when, after the latter has been extracted, the hair becomes chestnut; from which its red colour would seem to depend upon this oily material.

On the incineration of hair, iron, and manganese, sulphate and carbonate of lime, muriate of soda, and a large portion of silica, are given out. In the ashes of red hair, the quantity of iron and manganese that is contained is less, and in those of white hair it is still less; but in these magnesia is found, which is wanting in the ashes of other hair. In any case, the ashes of hair do not exceed .015 of the hair from which they have been produced.

From these trials, hair may be said to consist of these substances—Animal matter, in a very large proportion—a sort of white solid oil, in small proportions—a greyish green oil, in more abundance—iron, in an unknown state—

oxide of manganese—phosphate of lime—carbonate of lime, in a very scanty proportion—silica—and sulphur.

It is inferred, from these trials, by the above experimentalist, that hair depends for its colour upon a kind of oil, which is various according to the colour of the hair in which it is found; and it is conceived, that sulphate of iron contributes to the colour of black hair. The sudden change of colour in hair from grief is supposed to be owing to the evolution of an acid; but others, as Bichat, with greater probability, attribute this change to the absorption of the colouring matter. But to whatever cause it may be owing, the fact would seem unquestionable, and is supposed to display a more intimate connexion between the living power and the hair than some physiological inquirers may be willing to allow.

It seems evident, too, from the trials of Berthollet, that *wool* agrees in almost an exact manner, in its chemical nature and qualities, with those of hair, as discovered and laid down in the above results and conclusions. While growing on the back of the sheep, it is enveloped in a sort of greasy matter, which has been termed *yolk*, and which seems to have a kind of soapy quality, consisting, as shown by the trials and examinations of Vauquelin, of a soap of potass, a carbonate of potass, a little acetate of potass, lime, a little muriate of potass, and an animal matter.

This yolk is a material highly useful to the sheep in different ways, as by affording them more protection from wetness, and, perhaps, in some measure, from the attacks of insects, as well as by keeping the wool in a more soft and pliable state; it is, however, necessary to be removed from it by a proper process of the washing kind, before the wool is wrought. There is in the animal matter of wool an affinity with, and attachment to, different colouring bodies or principles, greatly exceeding that which exists between the different kinds of vegetable fibrous matters, as those of flax, cotton, and some others, for the same principles or bodies. There may also be other beneficial qualities and properties in it, which may contribute to the advantage of wool in the growing state, as it is always to be found in a large degree upon the finest-woolled sheep.

From this consideration of the constituent nature of hair and wool, as well as some other animal products, which are thought to be excrescences of much the same kind, it has been conceived, by the first of the above writers, that in regard to their formation, they may all be produced by secretion from the same kind of fluid, as compounded of albuminous matter in different states of arrangement and modification, caused by the secreting vessels, or small organized bodies of the skin; and thereby made capable of obtaining different degrees of induration or hardness; and that they, in all probability, acquire a consistent solidity, or proper hard state, by the taking up or absorption of the oxygen principle near to the superficial parts of the cuticular expansion over the whole of the animal. Wool and hair are, consequently, conceived to be formed by the same fluid, under different modifications, produced as above, each hair or fibrous part being supposed to be secreted from the albuminous material by such minute vessels as are wholly incapable of being seen, uniting themselves to others that are still of an increasing magnitude, until the several different filaments that are produced by secretion from each, are collected, joined, and combined into one duct of the excretory kind, situated near to the surface part of the skin in the animal. The filaments which are brought together in this manner in

the soft viscid state, are believed to be rendered properly hard by absorption in the way that has been already stated, and thereby to become a solid fibre or sort of thread, which is protruded or thrown out in the state of wool or hair. The single fibre, of whichever of these sorts, is, in this process, compounded of several very minute filaments or thread-like parts, which lie in a parallel direction, and are very intimately combined and connected with each other in their whole length. In some cases of hairs, the adhesive union of such filaments is so close and intimate, as not to allow of their being seen even by the microscope; while in others they may be seen with great distinctness, and in the largest of some animals, they are capable even of separation and subdivision to a certain extent.

These conjectures and conclusions on the nature and formation of wool and hair, are very greatly strengthened and enforced by what is brought in proof of them, as noticed by different inquirers, in relation to what takes place in the forming of other substances, which have much similarity to wool; such as silk, the webs of caterpillars and spiders, and other matters of the same kind. In all these they appear to be constituted in their small fibrous parts of many threads, formed from numerous and infinitely smaller filamentous portions, that become united as they extend in length. In some cases, these are extremely great in number, for the purpose, probably, of affording a more ready and better means of hardening by exposure to the atmosphere, and for acquiring a greater degree of flexibility; as though to the naked eye they may have the appearance of being single, they consist of the union of a great many different threads, by which they become much stronger, as is evident in a variety of instances, where such extended small substances are bound together by twisting or other methods, as in the making of ropes, some sorts of threads, and other such matters. On the same principle, also, wool or hair, in proportion to the fineness, have a greater or less degree of strength, as each of such fibrous parts, as are thus united, may be formed of longer and more fine portions.

Where the roots of such hairs as have been just pulled out have been examined by the microscope, in various trials, there have occasionally been discovered many distinct fibres of a small kind, combining and joining together at such lower parts; and it is not doubted but that many more would have become visible, if they had not, in their separation from the body, been broken away close to the root part. In these cases, the fibres were pretty much in a transparent state; but in the examinations of such substances in this way, as wool and hair, much caution is necessary, to guard against the deceptions that may arise from their partial transparent quality; as the apparent state at first given, of a bright line passing up the hair, has led to the supposition of its being a hollow tube, by many; whereas it is the consequence of the refraction of the rays of light on the sides of the hairy or woolly fibrous material, and which will be equally afforded by a solid thread of glass or any such substance.

These conclusions, in respect to the structure of wool, have been farther confirmed by the acute and correct investigations of Leuwenhoeck, who states, that each of such fibres of hair and wool, consist of long and finer parts united and kept together by means of a viscous cement, covered with a sort of crust or bark; and which is considered as probably the same kind of viscous material as is spread out over their whole superficial parts. Another inquirer, who has treated on spiders and their silk, has

given still further proof, so as additionally to confirm these statements. Wool, in its formation, takes place under the skin of the animal, by a process which is more slow and gradual: while in silk there is almost an instantaneous acquisition of solidity by contact with the air, on account of the very great minuteness of the filaments. The fibres of wool and hair, in consequence of their greater thickness, stand in need of a greater length of time in becoming hard and solid by means of drying, or the power of absorbing the oxygenous principle from the air, as already explained.

The very minute vessels which secrete the fluid that forms wool or hair, unite and come together " in the excreting duct near the surface of the skin, where the hair or fibre is formed;" and which " has the appearance of a bulb in the roots of human hair, with an opening nearly similar in form to the mouth of a trumpet, from whence the hair is protruded." Nor is it improbable, " that the hair may receive, by the alternate constriction and expansion of the orifice of the duct, through which it passes, minute indentations or ridges on its surface, which ridges may occasion the roughness that is felt when the hair is drawn through the fingers from the point to the root." It is to this peculiarity of the surface parts, that the felting quality of wool and hair has been attributed, as disposing the fibres to catch hold of each other, and in consequence of their not being able to draw back, when operated upon by other matters, they naturally advance by a progressive sort of motion from the end or point towards the root, and produce the effect noticed; which may be injured by lime, as causing more dryness and elasticity, as well as by its causticity in destroying the very minute inequalities of surface in the parts on which the whole depends. That this property is the consequence of the tendency of the hair or fibre to move in one and the same direction, when pressed in a repeated manner, is not much doubted; but whether it may be caused by the inequalities, or indentations, on the surface, cannot be so clearly discovered; and as there is a peculiar sort of sensation excited when hair is drawn through the fingers, from the points to the roots, which is, in some measure, the same as that of the vibration experienced in sliding the point of the finger over the smooth edge of a glass, it is suggested as probable, that these may be induced by such minute vibratory movements, which are more readily produced in one direction than another, in consequence of some peculiarity in the arrangement of the particles, or of the small filaments which constitute the substance of wool or hair. However, " whether the tendency of the hair or fibre to move in one direction when pressed, arises from a peculiar vibration, or from inequalities of its surface, it is considered as certain, that on this its felting quality depends;" which is a motion that " has been compared, it is said, to an ear of barley placed under the sleeve of the coat, with the points of its beards downwards, which by the action of the arm is moved in a retrograde direction, until it has advanced from the wrist to the shoulder." The same principle is further illustrated and explained by the process of hat-making and covering by means of a finer sort of outer coating; as the felt or body part, on which it is to be fastened, has the fine hair, which is to be laid on uniformly spread out upon it, and after being covered with a cloth, is pressed and agitated by the hand for a certain time, by which the hairs become introduced by the roots a certain depth into the felt, and so fixed as not to be readily withdrawn; so that if the pressure and agitation were to be

longer continued, they would pass quite through it, and come out at the contrary side, each of them taking the exact direction it had given it from the first.

These are some of the more interesting and useful points and particulars, in respect to the nature, structure, and formation, of wool and hair; but as doubts may arise, in consequence of their having a similarity to the substance of feathers, that point may be rendered more explicit. In feathers there is most clearly a circulation and secretion taking place until they have gained their full and perfect state; consequently, the diversity in the nature and increase of each of such matters, when fully attended to, may remove such doubts. In the case of hair or wool, in the first protrusion through the skin, it is, in every respect, perfectly formed, and in every part has the same size that it ever afterwards keeps; while, in the case of the feather, it would be wholly impossible for any part of it to be formed, and made full and perfect in its growth, within the skin. A tubular stem here first shows itself, from whence the other parts, in an after-state, shoot out, and have support and increase by circulating fluids from the bird that produces them. After the extreme parts of the feather get fully formed, they become hardened, and then the more minute vessels are closed, while the circulating fluids gradually descend farther and farther down, until at last they are prevented entirely from any entrance into the quill or body part. This is conceived to be the natural process in all such cases, and that as soon as there is a complete cessation of all such necessary secretions, the diseased state, which is termed the *moult*, is produced. This is a sort of feverish languor in which the bird loses its liveliness and desire for food, and is attacked by a kind of sudden cold shiverings; and this state continues until the old feathers drop off, when the secretions again take place, which restore the health of the bird, and give it a new state of feather.

It is, therefore, supposed, that hair is formed as fully, and in as complete a manner, when it proceeds from the skin, as the point of the feather is in its most perfect state; it seems to be increased in length merely by new hair being added at the bottom part, which protrudes and forces it in a forward manner; while, on the other hand, feathers and all such matters as have their growth and increase in consequence of interior circulation, not only extend in their growth from the higher parts, but continue to become in every way enlarged until they are fully formed. The difference which takes place between the growth and increase from the top parts and sides of the feather, and the lengthening by the simple addition of fresh depositions at the root parts of the hairs, is considered as clearly pointing out the diversity in the methods of their formation. This theory of the structure of hair and wool, is further illustrated from the circumstance of the former being not unfrequently split or divided at the end parts of it into separate fibres; and the same having likewise been occasionally noticed in the hair of wool, which proves that they are formed by a great many separate long filaments, combining into one thread-like hair, as already stated. The fact, however, does not rest merely on these grounds, but has been rendered certain, by the examination of the hair of different kinds of animals with instrumental aid; by means of which, numerous divisions, proceeding from the root to the end part, have been distinguished in large hairs. In one particular instance, fifteen of such divisions or fibres, in parallel position to each other, were distinctly perceptible; and in some of them even a further subdivision was seen

It is probable, that such subdivisions were each of them constituted of others still smaller, which the imperfection of instrumental aid may not be capable of discovering. If such be the nature of the structure of the hair in some animals, it is considered at least as probable, that in the hair of all others there may be the same sort of conformation, notwithstanding the fibres of which they are constituted may be so very minute, or combine so closely and firmly together, as not to allow of their being separated or even distinguished. Therefore, as wool, whatever the peculiar nature or qualities of it may be, is the hair of sheep, it must be formed by a process of the animal economy, which has much similarity to that which produces the hair in every other sort of animal. it is also justly inferred, as wool and hair continue so long after they have been drawn or separated from the skin without any decomposition or evident change taking place, that they do not undergo the deprivation of any secretions from the circulating fluids by such separation or removal.

Whether wool be a compound material, consisting of tubes or vessels deriving increase by the constant circulation and secretion of fluids from the animal, or whether, as in the web of the silk-worm, "it be a solid unorganized thread, composed of finer filaments," has been considered as a question of more curiosity than utility; but, if the latter supposition be well grounded, which the inferences from analogy and the most minute instrumental investigations render not improbable, it may tend to consequences of great importance, and contribute to much practical benefit in different ways, but especially in showing the necessity of paying more regard than is usual to the fleece before it is cut from the sheep. When wool is produced, it is provided with, and covered by, a greasy secretion or yolk, which intimates, it is supposed, that its defence and preservation is afterwards to be confided to external applications; but that "when from accidental circumstances of situation, this yolk is absorbed, or its copious secretion is prevented," the power of supplying the deficiency, and of assisting and promoting the uses which it affords, is given, by the applying of such oily matters as are more suited to resist and guard against the effects that may arise from soil and climate. In this manner an ability is said to be given, in the more northern regions, "to cultivate and bring to perfection," animal as well as vegetable productions of the southern more favoured situations.

These are the chief circumstances and principles on which the nature of the structure and formation of wool are founded; which, from their apparent justness, as well as their novelty, and the philosophical precision with which they are brought forward, are likely to promote the much-neglected, but very important, objects and purposes in view, namely, the bettering the growth and qualities of wool in general, and the rendering it more fit and proper for its different uses and applications. As by such endeavours not only much individual benefit must arise, but great advantage to the community be produced; the matter is greatly worthy of more full and close consideration, and of being more practically and extensively applied in the growth and production of wool in most cases of sheep-husbandry, as may be more fully seen in the more extended expositions of the same writer, which should be in the possession of every wool-grower and breeder of sheep.

GROWTH AND INCREASE.

Much doubt, difficulty, and uncertainty, as to the best practical methods of improving the growth

of wool, must necessarily be obviated, if it should be found to be formed and produced in the manner that has been laid down in the above positions and conclusions. As sheep in general are considered to be more restricted in their supplies of keep in the winter than in the summer months; wools are in common grown more fine in their qualities in the former than the latter season; as the fluid that forms them will then be lessened in its proportion, and the cold at that time may be considered as having the effect of contracting and narrowing the ducts near the more superficial parts of the skin. Some animals also give out the growth of a very coarse hair in the summer time, the bottom part of which, in the winter season, is found to consist of a fine down or fur. And it is conceived that many of such vessels as are destined for the purpose of secretion in these animals, which unite and join in the last duct, to form and constitute hair, may, in all probability, in such cold states of the weather, wholly cease to act, and only such of them as secrete and separate the most fine part of the fluid, that forms down, continue at such times in the state of activity.

Animals, which inhabit tracts near the Pole, are also remarkable for the growth of a lengthy coarse hair; and distinct from it, close to the skin, a short wool or down, which is very fine, and is considered as destined to preserve the animal warm, while the coarse hair serves to defend it from the effects of the weather, as well as from accidental injuries by the rocky and icy beds in which the animals in such situations repose themselves. In such cases, the fine down, it is supposed, is secreted by vessels that are smaller in their size, and from probably a more fine and thin part of the same fluid material, and that the formation of the hair and down may go on together at the same time, as they have their origin and growth from distinct and separate vascular parts. The seal of the South Sea is an animal of this sort, which affords a wool of the above kind, and which, being hidden under the coarse hairy coat, was long unattended to, but is now formed into fabrics which are superior in softness to those of Eastern production.

The conclusions and illustrations that have been given, in respect to the formation of wool and hair, lead to the explanation of many other points and circumstances in the growth of the former of these substances. Thus the prevention of its progressive advance, which is the cause of the *jointed staple*, and the production of the *hard, stiff*, or *cotted fleece*, is occasioned by a diseased state in the sheep, or more often from the want of sufficient food and warmth, when a sudden cessation of the functions which secrete the fluid that forms the wool takes place; and if that state should continue but for a short time, and then, in consequence of increase of food and warmth, production of wool re-commences, there will be a perceptible division in the staple, and, by pulling the different ends in a contrary direction, a break will take place where the stoppage happened in the growth of the fibrous part.

Where such causes act for a greater length of time, the wool that has been first formed, and then stopped, in its growth being prevented from further supply of yolky matter, becomes, in consequence of the action of the animal and the effects of continued moisture and wetness, felted together into a stiff cotted state. In some cases, this happens previously to the wool becoming separated from the skin; while, in other instances, it is in a great measure displaced and detached from the body, remaining connected merely by a small number of hairs in a dispersed state, indicating a very weak

and feeble state of the wool-forming process going on. There are some cases, likewise, where the formation of the new fleecy coat has begun to take place underneath that which is in the cotted state, which occurs when the animal again happens to have a better and more full supply of keep; the new fleece being connected with the cotty covering by a paucity of hairs in each staple that had never discontinued their growth. It is stated, that ewes which have had more than a single lamb, and have been exposed to cold and wet, or scantily supplied with food, are the most disposed to have cotted fleeces.

It is well known a more quick and coarse growth of wool commonly takes place soon after the season of removing the fleece, than at any other time; and on this account, more wool is produced where sheep are shorn twice than once only in the course of the year, the increase in the growth of it is conceived to arise in consequence of the removal of the weight of the pressure of the full quantity of wool on the secreting vessels, by which they have "a sudden re-action and activity given them," and a more abundant supply of fluid is prepared. There may also be a greater expansion and stimulus produced in the vessels by their being more exposed to the action of heat. For this reason the top part of the staple, which had its growth just after the time of being cut, will be found to be more coarse than the bottom portion of the same. For though the top part may be supposed to be that which was nearest the skin of the sheep at the period of being cut, and at one time the finest part of the wool; it is not really so, as the end parts of the staple are continually worn down and rubbed off; being the part where the wet rests, which occasions decay in the wool. This decay is the real cause of that brownness which appears at the top part of the staple, and which has been of such difficult explanation. Where the top of the staple is found to continue in a discoloured state, after having been washed, it may always be concluded that a partial decay has taken place, but the progress of which may be materially prevented by a single application of a suitable greasy material.

On examination of a staple of wool, grown in this country, it will be found that the bottom is somewhat more fine than the upper part, and that the top or end part is more coarse than the middle division. This difference is supposed to take place in consequence of the end parts being produced not long after the removal of the fleece; the middle portion, or a little more than half of the full length, in the summer and autumnal seasons; and the bottom or most fine portion, after the beginning of winter, and during the time until the taking away of the fleece. It may probably be objected to what has already been laid down, that if there were any tendency in increased food and warmth to render wool more coarse, that part of the staple which was the most closely situated in respect to the skin at the period of being shorn, having been grown in the end of spring and beginning of summer, ought to be equally coarse with that of the middle portion grown in the time of autumn. It must be remembered, however, that in the spring the fleece has in a great measure attained its full growth; and experience has shewn, that when the staple has nearly reached its full length, the secretions that form the wool are lessened, and its growth advances in a very slow manner.

In the case, too, of a fleece remaining two years without being shorn, and continuing to grow, the amount of the wool that is afforded in the latter vear is said to be much less than that

which was grown in the first. Any cause which lessens the secretion that forms wool, or the quantity of it which is grown in a limited time, has the tendency of making it more fine; hence the cause of wool having a greater degree of fineness, at the bottom of the full grown staple than at the top, is made fully evident. Whenever the former fleece or coat is removed, either by the shears or dropping off on its own accord, fresh activity and exertion are afforded to the secreting vessels. And it is suspected, too, that the necessary exposure of the skin to the more full action of light and air may partly contribute to the same effect.

It has been surmised, that, in tropical situations, the direct solar rays have the power of contracting many of the pores, or small openings, from which the finer fibres of wool take their origin, and to give capacity to others; in consequence of which coarse hairs and kemps are formed; but the influence and effects of the different changes of climate and situation are not yet sufficiently known to allow of their being in every respect accurately stated, though some of the alterations which they cause, and the nature of the action which they produce, upon the fleece or coat are so far understood as to render a knowledge of them greatly useful. We know that, under excessive heat, the close woolly covering becomes a short coarse hairy coat; where it is more temperate, in some instances, a covering of great length of staple is grown, with a disposition to produce a very soft short wool underneath the coarse one; and the effects of light and of the air of the atmosphere are also ascertained to have a power on the furry coats of various animals, to harden them, and thus lessen their value; and we see that persons, who are much exposed to the open air, with their heads bare, have the hair hard and coarse from the dryness so produced, or from the absorption of the secreting principle before noticed. From effects of this kind being known and well considered, the means which are most beneficial and requisite in the cultivation and growth of such wool or fur as is of the finest quality in the coats of animals designed for that use, may be ascertained and applied. How much may be accomplished in this way is hardly to be conceived, as trials of this sort have hitherto only been made with relation to sheep; but they ought to be extended to some other animals of other countries that afford coats of great length and extraordinary softness of quality, so as to determine the peculiarities of soil, climate, and management, that have contributed to the production of them: and such inquiries would be not only a matter of great curiosity, but of vast consequence to the interests of this country.

In consequence of the increased hardness and coarseness of wool from the operation of the above causes, the fibres or hairs of it, which have been covered and concealed in the time of their growth, will constantly be more fine and soft in the same kind of temperature, under the same circumstances, than such as have had their growth where the skin has been exposed to the more direct action of the rays of the sun. The most soft furs and downs are found on this account to be grown beneath the shade and cover of a coarse long hair; and the coat of "the abortive lamb, on which the light and air have never acted," is accounted, in some cases, a fur of the greatest value, in consequence of that superiority of softness which it possesses.

But, besides these principles which have been laid down and explained with so much ingenuity and clearness, there are other matters and circumstances not less worthy of re-

gard by the sheep-breeder and grower of wool, that have hitherto been little attended to, but which are of the greatest importance in the business of raising and providing wool.

The utmost circumspection is necessary that in the sheep used for breeding and growing wool, there be no disposition to the communication or production of any kind of improper colour, such as those of black and the more dark kinds, which lessen extremely the fitness and value of the fleece for many uses and applications. Such faults and imperfections are very prevalent in some of the native sheep of the more southern districts, as well as other parts of the kingdom, and stand much in need of being corrected by a much nicer regard to the selection of the sheep, in such cases, than has been usual; but the male should always be most particularly attended to, as having the most power in removing the injury of colour, as has been already shown in speaking of the ram. In the finest woolled flocks of the Spanish, and perhaps some other kinds, there should never be allowed any quantity of the above discoloured sort to continue, as the consequences would be most baneful to the fleeces of such sheep. The minutest indications of the origin or production of any thing of this kind in the wool, are therefore instantly to be corrected in the most full and effectual manner.

The quantity, and perhaps the nature, of the keep in sheep is likewise to be well regarded, with a view to the growth of wool; as where sheep have a sudden and full supply of food, there is a tendency to an increase in the growth and coarseness of their fleeces; which has been ascertained in the case of forest or less fine kinds of sheep, when put to fatten in pastures; but it is believed, that some breeds or sorts of sheep may resist such effects more than others; and those of the Spanish kind, probably, in a greater degree than any of the native sheep of this country. But though this may happen in consequence of the change from very inferior to good keep, it is not to be supposed that some breeds and kinds of sheep may not have the true growth and production of fine wool, under an abundant keep of the most nourishing kind; as it is not the actual amount of the food that is eaten by the sheep, but that of "the proportion of nourishment each species may contain" that is to be particularly regarded in such cases. For "if the food be supplied in nearly the usual quantity, and be of a kind on which the animal will thrive, it will produce no change in the wool," and "it is of little consequence whether it be given in the form of grass, hay, or turnips; whether in enclosures or open fields." The change that seems so speedily to happen in the quality of wool after the enclosure of land is generally allowed to be caused by the use of a more weighty sort of sheep; as where it is beneficial to grow fine wool, it may be accomplished by proper regard being had to the kind of sheep, and restricting the quantity of the keep given to them. Pastures of the best and most rich kind, if properly dry, may be made to favour the growth of the finest wool by more closely or heavily stocking the land, so that not more than their ordinary quantity of nourishing keep could be obtained by the sheep. Whenever sheep are changed in a sudden manner "from a bare to a very rich pasture," more full stocking having been had recourse to, no apparent difference in the fineness of the wool has been perceptible; it, therefore, would be most proper, until such change on the wool of the Spanish sort of sheep by rich keep be satisfactorily determined, that they should have nearly the same proportion of food as that which the stocks from which they are descended have been

used to, supposing it be sufficient to preserve them in a healthy condition. And from what has been already effected in the improvement of the growth of the wools of this country, by intermixing the above sort of sheep with the different fine-woolled native breeds, there can be no doubt but that there will be an increase in the fineness, as well as the softness, in the wools which they produce, by the increase in the proportion of the yolk that they contain.

The growth of fine wool, in Saxony, from sheep of the Spanish kind, has long been put to the test; and, after much examination, has been found to equal in fineness the first quality of the latter country. It is true grown, or has but little of inferior goodness in any part of the fleece; and likewise perfectly free from that coarse silver-coated hair running through the fleece, which is met with in different piles of the wool of the last kind. It is higher in value, and generally cleaner than the wools of this country, with more weight in proportion when washed; which affords sufficient ground for encouraging those, who wish for bettering the growth of the more fine clothing wools of the British kind. Owing to the effects of climate, however, there is less soundness in the staple, and less fitness of the wool for the manufacture of cloth, equally strong and lasting; the yolk is not considered to be so abundant in its supply, nor is the growth of the wool so closely set on the skin. The highly injurious defect of want of soundness, in the staple, may be caused by the occasional want of sufficient keep by severe cold, and by the frequent exposure of the sheep to rain.

The excess of heat is greatly hurtful to wool in its growth; but in this more mild and temperate country little is necessary to be said on that account; yet it is properly remarked "that in *proportion* to the *regularity* of the *temperature* in which sheep are *kept*, and to the *regular supply* of nourishment which they *receive*, will the hair or fibre of the wool *preserve* a *regular, even* degree of *fineness*" in its growth. It is further observed, that in hot countries the great dryness of the soil is destructive of the softness, and the searching heats are productive of much irregularity in the fineness of the growth of the hair. There is a difference also in the sheep which are more or less exposed to the severe heats of summer, as the wool is said to be less regularly fine in its growth, and more blended and intermixed with silvery coarse hairs, in the former than in the latter case. In this last situation, if there was to be a want of protection against such effects, the situation of the sheep would be worse in some particulars than in this country, and would be less friendly to the growth of a fine even stapled wool; but in what relates to the soundness and more soft fibrous quality of it, the continued rains here are extremely hurtful, in case there be not shelter and protection given to the sheep. On this account it is considered, that more regard ought to be paid to the action of external causes on the fleece of sheep than has hitherto been supposed necessary in this country. It is not doubted but that with proper attention to such causes, and by a timely prevention and counter-action of the effects of such of them as may be injurious, fine wool may be grown, and continued, in Great Britain, in every way equal in goodness to those of the Spanish or Saxon kinds.

With respect to the growth of fine wool, it has been well ascertained, on physiological and practical grounds, that by mixing the families or different kinds of such sheep, and beginning with the use of a more coarse coated female and the male of the perfectly pure woolled kind in the first state of the intermixture,

there will be a near approach in the fleece to one half of the fineness of that of the latter; and by continuing to intermix the produce in such cases with an equally fine-woolled male, the fleece in that state of cross or mixture will have nearly three fourths of the fineness of the first; when, by a further intermixture of the same kind for a few times, it will become of an *equality* of fineness with it. Thus by a succession of such intermixtures for five or six times, the best wool, in regard to fineness, may be grown. But in making use of a fine-coated female and coarse-coated male, the order of the change and the nature of the product will be wholly the contrary, and the growth of the wool be continually getting worse and worse, until the race of such sheep become nearly or wholly lost, which will be in the course of not many generations. The possibility of the growth of fine wool in most parts, where sheep can be kept, has now been fully ascertained; but the matter is quite contrary as to the growth of long wool fit for the comb, rich full pastures being essential for that purpose, and which are only to be met with in particularly temperate situations, in this and some neighbouring tracts of country; as such full-fleeced sheep could not exist without changing their coats to a sort of short hairy coverings, under the more scorching heats of other parts of the globe.

By due attention to the above circumstances and particulars, and to proper selection in the breed of sheep, are to be found the certain and perfectly effectual means of promoting the growth of good wool. But in all states and circumstances where there is a neglect or want of proper care in these respects, it must necessarily happen that a decline and falling off in the growth and production of the material must take place. These effects and consequences should, therefore, be well kept in the minds of wool growers in all situations.

Relative to an increase in the quantity of wool of the different sorts of sheep, there is more difficulty and uncertainty; but there are some grounds for believing that it may be effected, at least in some cases, without any very unfavourable consequences to the quality of the fleece, especially in the more long-woolled breeds or kinds of sheep. There is much reason for supposing, that by a less mixture of the different sorts of these sheep, a very material increase in the quantity of wool produced by each may be effected, without at all lessening its fitness for the process of the comb; as by too great an intermixture of the *large* sheep, that produce long wool, with those of a *more delicate* long-woolled kind, there is almost constantly a considerable reduction, amounting in some cases to two pounds in the fleece; and which the manufacturer also considers as less useful in many cases, from its greater tenderness of quality.

The increase of the quantity of the wool, in the short and fine-woolled breeds of sheep, is attended with much more difficulty and a greater want of practical certainty, than in the case of the other sort; as, in this kind, there is a necessity for its being fine in the fibre, and of but little length, quality being more the object that is desired than quantity. In such cases, therefore, there should be much attention paid to the fineness, shortness, delicate softness, and whiteness, in the fleeces of the sheep which are to be employed, as well as a closeness in the setting of the fibres on the skin, and a freeness from kempy or other hairs; which qualities appear, in some respect, incompatible with an increase of the quantity of wool. It has been stated, however, that in Sweden and Saxony,

the fleeces of the fine-woolled sheep are capable of being increased by an increase of keep, in the former one half, and in the latter very considerably; and that the increase of food does not injure the quality. In Sussex, Mr. Elman increased the quantity of the wool in the fleece, in the South Down breed of sheep, not only without injury to the quality, but with an increase of goodness and value, as bringing the highest price of any of the same kind, by means of larger size and more keep. But if the latter be only capable of producing such increase, either by giving length to the staple, or by occasioning more thickness of the fibre, as has been stated, it must necessarily render the wool more long or more coarse, and, in some cases, be productive of both effects. To put an end, however, to every doubt on the matter, the unquestionable fact, which has been proved by the full experience of the dealers in wool throughout the kingdon, is, that after such winter seasons as are fine and open, there is a larger amount of wool produced, than in cases where there has been a severity of weather at such periods; the difference of which, in some circumstances, may be to the full one-fifth of the united weight of the whole amount of the wool raised in the country. In all such cases, the fleeces are greatly more large, but the wool constantly more coarse, as is well known by the fully experienced sorter of the material. It, consequently, appears, that no increase in the quantity of short wool can be made, without the deterioration of the quality of the fleece. Nor, probably, can the increase in size to any great degree be had recourse to, without risk and disadvantage; as the sheep, in order to produce such fine wool, are mostly kept on the more poor and steril pastures, they may not only be unfitted for such keep, but may also produce a less fine wool; whilst the quantity may be little or not at all increased, as it is only sheep of the smaller size which are properly suited to such keep. A highly luxuriant keep, of the root or any other kind, must also have the effect, in such cases, of producing the wool more rough and stiff, though somewhat increased in the quantity. Consequently, the increase in quantity, with the preservation of quality, cannot be easily gained by such means; but the improvement of the latter may be readily produced. Some advantages are certainly to be gained in the increase of quantity, as well as the bettering of the quality, of such wools, by giving a more equal degree of fineness over the whole sheep, as well as by causing it to rise in a more equally close covering in all parts of it, by the choice of the proper sort of sheep for such purposes. It is noticed, that in cases where vegetation has sustained but little restraint from the severity of the winter, the increase in the fleece, and the greater coarseness of its hair, after such mild seasons, are chiefly caused by the more large proportion of keep which the sheep gain at such times. It is further remarked, that with regard to the flocks of the long-woolled sort, which are used to be fully supplied with food in such winter times, that sometimes, in consequence of the store-master trusting too much to the mildness of the season, in such circumstances, he has wholly withheld the over supply; which often occasions particular parcels of wool, in such sheep, to be more light after such a winter as is mild, than such as is severe; the fleeces, in such cases, being jointed in the staple, with more fineness in the hair near the jointed part, which renders wool of such kind unfit for the comb. This is considered a case which proves the effects of increase and decrease of keep on the long combing sort of wool, as the changes they

cause in such wool are the most strikingly evident to those who are not accustomed to particularly examine the nature of the woolly fibre; and may serve to render it more perfectly clear. The increase in the quantity of wool by rendering it more coarse or of greater length, can, therefore, only be properly put in practice, in some particular cases, with the long-woolled sort of sheep. In the small fine-woolled kind, it can never be beneficial, though it may be considerably enlarged in quantity, without any bad consequences, by such sheep of that sort being selected and used as have the wool coming from the skin in the most thick and close state, and with the greatest uniformity and regularity over every part of the animal. In this property, the fine Spanish breed has much the superiority to any of the kinds of our native sheep. Whatever may be the relative difference in the weights of different wools, when in the perfectly clean state, it cannot be such as to be of any material consequence in either the growth or the increase of the wool.

PRINCIPLES AND MEANS OF IMPROVEMENT.

With a view to the improvement of wool, many other points and particulars require especial attention, besides those which relate to the breed of the sheep, and among these are, the kind of soil, the nature of the climate, and the sort of keep. But the first regard, next to the breed of the sheep, ought, probably, to be bestowed on the nature of the causes which have hitherto impeded the improvements that are capable of being made in this very extensively useful material. What is necessary, in respect to sheep in general, has, in some degree, been stated and explained in the preceding consideration of the principles and circumstances, that operate beneficially, or otherwise, on the nature and production of the fleecy coverings of such animals. In some kinds of sheep, however, as those of the fine-woolled Spanish breed, it is necessary, for preserving and improving the wool in all its best properties and qualities, that different points and matters be more particularly attended to and put in practice; for instance, the most perfect purity of the fleece must be preserved, which is only to be accomplished, as has been seen, by the utmost care and exactness in providing the male and female parts of the stock, and which is, therefore, a point of very great consideration; and, also, great care should be taken, that the coat or fleece be naturally impregnated by a very full supply of the secreted greasy material, or yolk; or where deficient, that it be afforded by other means; having constant regard, that it be not wasted by the loose mouldy state of the soil, or the washing effects of much and heavy rain; that the animals be preserved properly free from wet, and protected against the excesses of heat and cold; and that the quantity of the nourishment afforded by the keep, be properly regulated and supplied.

It has now been sufficiently proved, by the various extensive trials that have been made of sheep, that afford fine wool in many countries and in various parts of the continent, that the circumstances of keep and the effects of climate have, in a comparative point of view, but little power or effect, in regard to the improvement of such wool; and that it may be had equally fine and improved, where the sheep are, for the most part, restrained and fed in confinement on any sort of dry food, without pasture keep. It has been seen, too, that such fine wool may be produced on the best and most luxuriant pasture lands, when properly close and amply stocked, so as to pre-

serve such a constant bareness as to prevent too great an abundance of the food. But there can be little reason for doubting, that such soils as are light, dry, and close in their herbage, are the most suitable for promoting the healthy condition of the sheep, and for improving the nature and qualities of the fleece, especially in such a humid and damp state of atmosphere as that of this country.

There are also some other circumstances and particulars among sheep raisers and keepers in this country, that operate unfavourably in respect to the production and improvement of the fleece of the fine Spanish kind of sheep; one of the principal consists in mutton being so greatly the consideration of the sheep-feeder, and that no intermixture of them with those of the fine-woolled sort in this country has hitherto been found capable of producing a kind that have an equality in the goodness of their form, with that of some of our finest-woolled native breeds or sorts, or that are capable of supplying the same amount of equally good mutton, when killed, in the same given time, and with the same keep.

The manner of washing and cleaning the wool of the pure Spanish and the intermixed Spanish kinds of sheep, that are here usually proceeded with, has also an unfavourable effect in preventing such wool from fetching its proper and just price in the market; as the former is wholly incapable, on account of the great quantity of natural greasy material or yolk, of being washed and made clean on the backs of the sheep, by simply putting them in common water, and that of the use of the too general method; it may first, perhaps, be somewhat cleaned in this manner, and afterwards, when shorn from the sheep, undergo a more perfect cleaning, as in the Spanish method, but it would be inconvenient, expensive, and attended with many difficulties. Some improved means of cleaning and washing, as repeatedly by the use of ley and warm water, in vessels or other contrivances for the purpose, as in some foreign countries, may become necessary here, before sufficient encouragement be given to the introducing of the wool of the intermixed kinds of our native fine-woolled sheep with those of Spain, in consequence of the very great loss that attends the cleaning and manufacturing of it.

In regard to the more heavy long-wools, little further is necessary to be observed than what has been already said upon them, as for most uses to which they are applicable, scarcely any thing is left to be done. But in some instances in the nature of the soil and keep, where such long-woolled sheep have been too much in use, but where the soil and produce has been discovered to be insufficient in quality for the production of it; a perfect state of fleece of from five to six pounds, or more, in some cases, in weight, of unusually fine wool for the comb, might probably be gained, by the proper intermixture of ewes of the long-woolled kinds, with rams of the mixed, native, and Spanish sorts; and as such a change may be greatly useful and advantageous on such pasture lands as are capable of properly supporting more weighty long-woolled sheep, in consequence of the differences in the improvements of the working of such materials, and the increase in the demand of such goods as are of a more fine kind.

The principal causes which seem to have had an unfavourable influence in preventing improvements of this nature, have been the want of a sufficiently perfect acquaintance with the circumstances of soil, climate, food, or keep, and some others that have acted beneficially or injuriously on the fleece; for until

these become well known and understood, the advancement in this respect must be slow, uncertain, and imperfect; therefore, if what has been stated by the writer on wool, noticed above, be correct, which can hardly be doubted, it must be of very great utility and advantage in directing the means of improving the wools of this country, by greatly increasing their value, and, in some measure, the quantity; and at the same time bettering the state of the sheep in several other respects.

It has been found, it is further remarked, from carefully attending to the produce of wool from soils of different parts of the kingdom, that those which are the most beneficial in producing it of the most soft, silky, and best kind, are, in the first degree, the clayey; and, in the next, the silicious, sandy, or gritty. On the other hand, it is said, that the friable and broken-down chalky and lime-stone sorts, have, for the most part, long been considered as productive of such wools as are quite opposite in their qualities, having much hardness and a harsh kind of roughness in the feel; and that these effects of them are found to be much in the degree in which such earthy matters may prevail in a more or less loose and broken condition, on or near the surface of such soils, without the least difference in respect to the breed or sort of sheep from which the wool is taken. These circumstances respecting such soils, in consequence of the nature of their operation in the production of such effects being too imperfectly regarded, have led, not without some reason and probability, to the notion, that the pasture keep afforded in different cases of soil had something peculiar in it, which possessed the means of changing the circumstances of the production of wool. Certain changes, as have been seen, take place in the naturae of the wool from the quantity, but not much in consequence of the kind of keep on which the sheep have been fed; as such changes arise from very different causes, which have been too much overlooked, for wools of a soft kind are capable of being produced on soils which are the least friendly to the raising of them.

The peculiar minuteness and soft yielding state of the fibre, in some instances, have caused hair to be termed wool, in consequence of its fitness for, and capability of, being fabricated into cloth of an uniform good quality in every respect; but when the hairy fibre has such a hardness and elasticity as not to possess that capability, it is no longer known by the name of wool. Some wool, of course, has much more nearly the state of hair in the hard and elastic nature of the fibre, than another that is equally fine; the cloth prepared from which is hard and harsh in its feel, and wants firmness and a better surface covering, being very much inferior in value, on several accounts, to that made from properly soft and silky wool. There are some further effects and consequences produced on the nature and state of wool, by the agency and exterior properties and circumstances of soil and situation, that demand attention and investigation by the improver of wool.

Supposing that the food in the pasture keep of sheep, as has been shown, has not the power of causing that difference, as to the softness or hardness in the nature of wool, which is the product of different soils, it must have its origin, it is believed, in some operation of such soils in a less general manner upon the more superficial parts of the fleece or coat itself. This fact, however it may have eluded the notice of the wool grower, is supposed to be capable of proof; and, in addition, that the particular tinge of the soil can be unalterably fixed

and given to the substance of the wool. Thus, whatever the nature of the soil may be in respect to colour in different districts and parts, the coats of sheep become affected by such colours: in those situations where ochres abound, with a darkish orange; in others, where there is a redness in the mould of the soil, something of a brownish cast is given; and in some other places, there is a sort of dark blue tinge imparted: where chalk prevails, there is a kind of whiteness in it; and in all cases, it is supposed, there is the proof of the effects of the soil on the fleece, by the similarity of tinge in the colour being given to it, by some sort of action on, or union with, the fibres of the substance. Sheep that are open or coarse in the pile of the fleece, there is some reason for supposing may be the most disposed to such effects.

The change in the hardness and softness of wool can be equally effected by similar causes in the nature of soils, as is remarkable in some districts and situations, where the differences are suddenly perceptible on comparison; and the different effects which they invariably produce are extremely striking: as, for instance, when separated only by a small rivulet, one is wholly of the lime-stone, and the other of the grit or sand-stone kind: the difference, in such cases, in the value of the wool, from the same sort of sheep, has been from one to two shillings more on the tod on the latter than the former. It is evident, from many circumstances, that calcareous earthy matters have the power of taking away the softness of the woolly fibre, by acting directly upon it; which they effect, it is supposed, by absorbing the natural greasy substance of the wool, and forming a sort of imperfect sopey material, that readily mixes with the rain, and is quickly washed away; in consequence of which, the means of preserving the softness is lost, on exposure to the effects of the air and wetness taking place, and the bared staple is exposed to the very powerfully drying action of such earthy matters. Thus, then, whenever such earths are brought to act intimately on the surface of the fibres of the wool, they rob it of its softness.

Clayey and sandy soils are more friendly to the producing of such wool as is soft and of a fine quality, in consequence of the absence of such absorbing and dying properties as are in those of a calcareous nature. These are the chief circumstances of soil, which are necessary to be here noticed; and which, with those of climate and keep, as already considered, may be sufficient to point out the means which are proper and essentially necessary in preventing injury, and promoting improvement, in the growth of wool, on principles which appear to be the most sound, by practices the most suitable for the purpose.

The causes of different kinds which operate improperly in the promotion of the undue hardness, stiffness, and stubbornness of the fibres of the wool, are, therefore, in the first place, to be guarded against and counteracted as effectually as possible, by such suitable means as are hereafter specified.

In the next place, where the greasy matter on the woolly fibre is deficient, and, in consequence of such deficiency, a hard and harsh state of the wool is produced, such an artificial application is to be made to it as will have the power, by its softening greasy nature and tenacity, to spread over and rest upon the fleecy covering of the sheep, so as to prevent the unfavourable effects of soil or other causes, and to produce that softness which is so necessary and valuable in wool. It is well ascertained, that fine wools may be preserved in the proper soft state by these means, which have been

resorted to in several cases in different northern districts.

Consequently, much advantage will every way be gained to the sheep, as well as to the improvement of the wool, by properly attending to and regulating this practice; and by due precautions against the hurtful effects of the action of those soils which are of a calcareous nature. There can hardly be any doubt of the softening effects of such greasy substances when properly applied and made use of in these cases, from the nature and operation of its effects when employed in other instances; and, consequently, it may afford a better protection to wool, and improve it more than almost any other method that can be attempted; and while such an effect is thus produced on the nature of the wool, it will increase in fineness and quantity, whatever else may happen in consequence of its improper use. But the benefit of applying greasy matters with a view to the improvement of wool, and the very evident grounds on which such benefit rests, have yet been scarcely at all considered by the improvers of wool in this country, though it is of great antiquity, and has long been a practice in some districts for the purpose of preserving sheep from disease. The use of such a remedy has, in consequence, commonly been treated with reprobation, and the wool in such practice considered as becoming inferior and of less value. Even in some districts where the fleecy material is far more improved than in any other of our native sheep by such practice, the effects it produces are said not to be fully known, and the application is not made in sufficient time before the winter comes on; in consequence of which, the top part of the staple loses the benefit of being preserved in a proper state of moisture and softness in the time of the action of the greatest heats.

The line of distinction and difference between the wool which has had the greasy application, and the contrary, is so plainly evident, by the discolouration that is left in the staple, that the part nearest to the skin, where it has been laid, is much more fine and soft than the higher part which was produced before it was applied. The extent of the difference fully shews the utility of the practice, and the impropriety and disadvantage of its being used only at the latter part of the season of the year; since in order to gain the most benefit from it to the wool, as well as the sheep, it should be made use of directly after the fleece is removed, and be applied a second time as the winter comes on; as by the former there will be a covering and defence provided for the wool against the effects of the soil, when its parts are in the most loose, powdery, and efficient state, and it will be preserved in a more moist condition in the time of the drying and scorching heats of the latter end of summer. It is supposed, too, that the top part of the staple may by this application become less hard and harsh in its nature, and be more free from the faults in colour, to which the wool of this country is so frequently liable. This practice also, while it causes the destruction of vermin that are so constantly troublesome to sheep, and prevents affections of the skin, has the effect of saving much wool that is torn away and lost by their continual rubbing against different bodies in consequence of such causes. It is conceived likewise, that the practice, by always preserving the skin of the sheep moist and soft, has a beneficial effect in causing the wool to be more fine, in consequence of the small pores or vessels that form the wool being somewhat closed, or ceasing to perform their office, when the skin is more fully open to the effects of the air and soil, as by such means the

pile is made to rise in a more close manner, and the fleece becomes larger in size.

It is not doubted but that the practice in this way, in every part of the kingdom, would be attended with more benefit to the sheep and the wool "than the natural yolk of the fleece," were it much more largely afforded than is ever the case in any of the native flocks of this country. The application of such a material has the power also of giving warmth, and of resisting the effects of moisture much more "than the natural yolk;" while the latter readily forms an union with water, and soon becomes lost, subjecting the sheep to the pernicious effects of evaporation over the whole of its body. The prejudices which have so long prevailed against it, in consequence of the want of a more perfect acquaintance with the nature of its operation and use, must, it is presumed, give way, as they become better known, and as the difference in the manner of its preparation and application are more fully understood and attended to.

What is necessary in these respects, is, that some less expensive substance be employed instead of tar—that material, when largely used, being greatly hurtful in giving the wool too dark a cast: yellow ochre or fuller's earth might probably be found fully to answer such purpose, as being of greasy qualities, and uniting well with matters of the oil or butter kinds; but what is proposed, is, that bees-wax, butter, hog's-lard, or olive oil, be melted and mixed together; and that tar, if used at all, should be in very small proportion, as not more than two pints to ten pounds of the whole. But where there is sufficient protection, or where the soils on which the sheep are kept are free from any sort of calcareous matter, a less stiff material of this kind may be had recourse to, and the tar be wholly rejected in the mixture. Great improvement also may be made, in some cases, by a thin application of the above kind of oil and butter directly after the fleece is shorn; but all the advantages of the more stiff sort would not thereby be gained, though the effects of sudden cold would be prevented, and the wool would be preserved.

The same practice of applying greasy matters to the long wools of that kind of sheep, though they cannot, in consequence of their different uses, be equally beneficial in improving them with those of the other kind, have from late trials been found to be materially useful in rendering them better in different respects than those ever before produced from such kinds of native sheep.

All that is to be done in this practice, therefore, is to have the sheep greased by the above substances formed into a sort of ointment, and laid on close to the skin, especially on the back and sides, at the time the sheep are shorn; and again in the beginning of the autumn, in a more exact and careful manner, and with much greater stiffness and consistence in the material that is employed, it being put close to the skin, by the finger after a shed has been formed in the wool of the fleece. In cases where the soils are in their nature chalky or limestony, a larger proportion, or a more frequent use of the substance, will be requisite, in order to produce the proper effect; and in places where rains are prevalent, a little tar may be beneficial by giving consistence, though when wax is mixed with it, a great deal less of it will be required than is at present used in the best districts of the practice.

By these means being regularly and properly employed, with a better and more clean method of washing and freeing the wool from all kinds of dirty matters, much benefit in the improvement of wool may be gained, and the sheep of

this country be kept in a more sound and perfect state of health and condition.

If this short view of the grounds, principles, and practices, which has thus been brought forward, be sufficiently correct, the nature and circumstances of the several causes that influence the production of wool may, in no great length of time, become much more fully and generally comprehended, and the practices that usefully relate to them be rendered much more intimately and exactly known than is at present the case; by which means a higher utility and advantage must result, not only to the sheep-breeder and keeper, but to the nation in general, and great merit be the reward of the acute and laborious investigation from which they have been formed, and are exhibited in the ample and extended detail of facts and particulars by which they are supported.

OTHER FINE-COATED ANIMALS.

Besides the sheep, there are some other quadrupeds, some of which in some measure approach the nature of it; and others of a smaller and larger different kind, which, in all probability, might, by careful attention, be easily and readily naturalized and inured in a little time to our climate, and thus render their introduction of very great utility and advantage to the country, by the rich and highly valuable coats or coverings which they bear, in our manufacture of fine fabrics, or articles of the wearing kind.

The Angora or Cashmire goat, the several varieties of the Vicunna, and of the Pacos, are of the first sort; the former kinds, beside producing a coarsish long hairy covering, afford another of a quality so fine, soft, and silky, as to be with propriety termed wool, and to far surpass in these properties the very finest fine sheep's wool.

From what has taken place, and been already done in France, in the introduction of the Cashmire goat, there cannot be much doubt of the complete success of such trials with that fine-coated animal in climates which approach much in similarity to that of this country, as will be more fully seen under the head—Goat.

The fine silky coat of the Angora goat, which is properly long woolled, is in much use in France, in some worsted fabrics, in mixture with silk.

In the varieties of the two latter sorts of animals, there are some which are almost wholly white in their colour, and which would, doubtless, under suitable care and management, produce a fleecy covering entirely destitute of the coarse lengthy hair with which the downy part is not unfrequently blended. The wool of these animals, when thus perfectly free from such hairs, would be greatly more valuable, and be worth thirty shillings or more the pound; while the meat, which would be afforded by them, would from their nature apparently be equal to that of the flesh of the fallow deer or finest venison of this country. The wool or coat of the Vicunna, usually termed Vigonia wool, is commonly of the reddish fawn colour, and particularly silky and soft, but intermixed with coarse hairs of considerable length, which are not separated without much difficulty by the manufacturer. From the

pacos, as well as the lama of Peru, there is obtained a stronger and longer stapled wool, which is sometimes white in the colour.

Of the smaller description of animals which appear capable of being familiarized to, and greatly beneficial, by the fineness of their coats, to the manufacture of different fine articles of dress in this country, would, in addition to the above goats, seem to be the Angora rabbit, and the Angora cat, which have highly desirable coats, or coverings, that are fit for many fabrics of the more fine kind, as they still, in their native situation, produce a fine long wool, while that supplied by the goat of the same district is little inferior in fineness, beauty, and lustre, to that of silk.

It is suggested by the writer on wool, noticed above, that if these two different animals and the goat, " were not originally distinct varieties of their species, it would be an object of much importance, as well as of considerable curiosity, to ascertain the circumstances of soil, of climate, and of treatment, which gave 'them' a long coat of such peculiar softness." But that " it seems still uncertain, whether the shawls, and other articles of Persia, and of India, are fabricated from the produce of the goat or the sheep." And that " an expedition to obtain some of these animals, would offer a richer prize to our manufactures, than the acquisition of the golden fleece; for British industry would soon convert the wool into fabrics of more value than their weight of the purest gold. The finest wools of Europe cannot in the least compare in softness with the Asiatic fleece," or that of the east.

Among the large sorts of animals which seem capable of being introduced, and of bearing the state of the climate of this country, are the Yac, of Tartary, which may be considered as a sort of wool-bearing ox. The musk-ox, of Hudson's-bay, too, which, if we are rightly informed by naturalists, affords a wool that is finer and softer than that of the Vicuna or Vigonia wool, and, consequently, finer than any that is yet known, is another animal that may be beneficial in the same way. But the wool or furs of these animals have hitherto had but little attention bestowed upon them, though some articles of the stocking kind are said to be made from that of the latter kind, and worn by the natives of that place; but that the wool, though soft, is not fine, being much mixed with coarse hairs of considerable length.

The large bison which was lately shown under the title of bonasus, in the metropolis, had, on different parts of the body, several distinct fine sorts of woolly fur under the long, hairy, external coat, or covering, which might, most probably, be made applicable to the forming of different fine fabrics, by the knowledge and proper care and attention of the farmer and manufacturer; and such kind of animals be rendered tame and domestic, and thus be made of much utility and benefit.

It has been observed, too, by an ingenious and accurate inquirer, well acquainted with the nature of wool, that there are some cattle of the Scotch more thrifty kind, which have upon their backs tufts of soft woolly hair; which, if they were properly regarded and managed, it has been supposed, might probably afford a valuable addition to the materials on which national ingenuity and industry might be capable of being usefully and profitably employed.

Under liberal and proper protection, care, and encouragement, there can be little doubt that the fleeces or coats of all or most of these animals might be greatly, and so improved, as to become articles of very great value and national importance, as it is already well

ascertained, that the coats of some of them have been spun and woven into cloths and shawls, of which some were of much more value than any ever afforded by the wool of any sort of European sheep.

In this intention, by due care and attention in the selection, protection, food, and treatment of the animals, many useful articles of the wool or fur kind might probably be raised and grown in this climate, that would be extremely valuable for different fine purposes not, perhaps, yet thought of by the manufacturer, as much, in all such cases, would seem to depend upon the nature of the cultivation and management which is bestowed on or pursued with them; for not only the coverings of most wild, fine, coat-bearing animals, which inhabit cold climates, are constituted, as has been seen, of two coats, one of which is a soft hairy down, which is covered and protected by another, which is much longer and more coarse in the hair; when they are removed to more mild and temperate climates, or become placed under better care, and are more fully and perfectly secured from the severe and intemperate effects of the weather, and better and more properly supplied with food, the latter, or the long coarse hairs, or hairy coat, falls off, the animals retaining only the more soft short hair, wool, or fur; and the European sheep, also, on being introduced into tropical climates, and greatly exposed to the heat, soon becomes in a state of languidness, and loses its fleecy coat, which is supplied by a covering of short hair of the coarse kind. Sheep in high exposed situations, in different countries of Europe likewise, not unfrequently give out coarse, short, white, hairs, which are termed kemps, in mixture with the more fine wool; which on their removal to a more warm situation, and a more favourable pasture, have the coarse white hairs falling off, and which are not again renewed in their growth. These facts and circumstances are evidently in proof of the great effects of attention and cultivation on the coats and fleeces of animals; and it may be noticed, in addition, that sheep's wool of a good and valuable quality is seldom or ever found, except in such countries and places as have been at some time the seats of the weaving and manufacturing arts and improvements, and where a high state of refinement and elegance in dress is still present, or has at some period predominated; which is still further strongly in proof, it may be presumed, that such fleeces have been, in the first instance, procured by a long and constant careful regard to the choosing and providing of such animals of the sheep kind which afford the best, most fine, and most valued wools for the several uses to which they were to be put in the fabrication of articles of the dress kind.

It has been well remarked on this subject, that, " the power of words, when inaccurately applied, in retarding the progress of improvement, may frequently be traced in the most common occurrences of life;" and that it is believed, that " it has had no inconsiderable effect, in this instance, in preventing the cultivation of wool, in Europe, on the skins of other animals besides sheep." It is supposed, that " no one will deny, that it is impossible to produce wool on the backs of the ox or the ass, if we restrict the term wool to the fleece of the sheep; but if by wool we mean a soft fine hair, possessing all the properties which render it suitable to be spun, woven, and fulled, to make cloth, the oxen of Thibet and the asses of Chili do produce, and have for centuries produced, such wool."

Many of the oxen and asses of this kingdom, as already seen in the former, might, by proper means, such as those just suggested,

perhaps be rendered useful in such intentions, by having proper care, cultivation, and treatment, as above proposed. And some of the common goats in European countries afford a fine down, similar to that which has been described, which, by suitable cultivation and care, might most probably become an useful and beneficial article of trade and manufacture in the climate of this country.

In what is termed Asia Minor, Damascus, and some other cities of antiquity, are said to still preserve in their neighbourhoods the marks of the cultivation formerly of fine-fleeced animals; and the fine-woolled Tarentine sheep so greatly prized by the ancients, are supposed to have been procured from the above district; and it is considered as "highly probable, that these sheep came originally from the more eastern seats of luxury, where the soft fleeces are now grown, of which the shawls and cloths of India are fabricated."

Though some have contended, that fine wools, or the coverings of sheep, and probably other animals, are the result and consequence of climate and food, the matter of fact is not exactly so, yet both may be allowed to have some effect and influence on the nature and quality of the wool or fur, though it is to the breed alone that the fineness of the fleece or coat is primarily owing, and which gives and determines its particular quality in that respect.

It is not to the coverings of sheep alone that the term wool has been exclusively applied, but also to the fine, soft, hairy fibre or down of most quadrupeds, and some birds; yet the distinguishing mark between wool and the fine hairy production of animals, is somewhat indeterminate and involved, consisting of the more or less degrees of fineness, pliability, and softness, of the fibres which compose them. But it has been stated, that "when they possess these properties so far as to admit of their being spun and woven into a texture sufficiently pliable to be used as an article of dress, they are called wool," which, consequently, equally applies to the productions of many of the animals which have been considered as proper for the affording such articles. It is noticed, too, "that the gradations between wool and hair, on the skins of some animals, are often too minute to admit of accurate distinction;" and that "the fleeces of many sheep contain fibres so hard and coarse, that they may most properly be called hair; and some hairy animals produce on part of their skins fibres possessing all the properties of wool;" nay, that "even in fleeces from the sheep, we may sometimes observe the very same fibre to be a coarse hair at one end, and at the other end a comparatively soft wool." These facts sufficiently point out the propriety of having recourse to other such animals as those which have been mentioned, as well as the sheep, for the growth and production of fine materials for the supply of our manufactures of fine fabrics in this country.

It is, without doubt, an object of much more consideration and advantage than has been commonly conceived, to have some of the fine kinds of these materials raised and produced in this country, so as to be in more plenty and more ready at hand, as not only leading the manufacturer to an increased preparation of the more fine articles of dress which are in common use, but as encouraging him to make further trials and attempts in the fabrication of new sorts of such fine goods at less expense, by which much profit and national utility and benefit might most likely be derived, besides no small increase of labour and industry be produced.

The above hints may, in some measure,

serve to guide, encourage, and direct, any endeavours which may be made to introduce animals for such purposes into this country, so as to benefit the views of the manufacturer.

But besides the introduction of some of the more suitable kinds of the animals which have been noticed, into this kingdom, in the intention that has been suggested and proposed; it would seem not to be less desirable, or less an object of regard, consideration, and advantage, in the government of this country, to have the animals of the east, both of the sheep and goat kind, and perhaps others, which afford the peculiarly soft shawl-forming wool, procured and introduced into such of our settlements abroad as are the most proper and suitable for the purpose, but especially those of New Holland, which are in most ways so extremely favourable for the design, as that would be a most useful and valuable product, which is greatly in demand, and difficultly procured by the manufacturers of this country.

It has, indeed, been supposed, that there can hardly be a doubt, that under the very favourable climate of such settlements, "all or most of the Asiatic wool-bearing animals," which are peculiar to the most distinguished districts of that country might be had recourse to, and be provided for the purpose, with every chance and prospect of success. By this means, these fine, soft, woolly materials, might be so increased, as to constitute an extensive article of export and exchange by the colonist, for the manufactured goods of Britain, and thus a very beneficial source of advantage be provided for the colonies, as well as the mother country.

END OF THE FIRST VOLUME.

LONDON:
PRINTED BY W. CLOWES,
Northumberland-court.

A

COMPLETE SYSTEM

OF IMPROVED

Live Stock and Cattle Management;

OR,

THE PRACTICAL GUIDE

TO

GENTLEMEN, STORE-MASTERS, FARMERS, AND OTHER KEEPERS OF STOCK,

In perfecting the Breeds and Varieties of the several Kinds of Live Stock,

IN EXPLAINING AND INCULCATING

THE NATURE, PRINCIPLES, AND BEST METHODS OF BREEDING, WEANING, REARING, FEEDING, AND FATTENING THEM; THE MANAGEMENT OF THEIR DIFFERENT PRODUCTS, AND THE MOST SCIENTIFIC MEANS OF CURING THE VARIOUS DISEASES AND ACCIDENTS TO WHICH THEY ARE EXPOSED;

WITH CORRECT DESCRIPTIONS OF THE NUMEROUS BREEDS AND VARIETIES OF EACH SORT, THEIR CHARACTERS, PROPERTIES, USES, AND BENEFITS,

SHORT INTRODUCTORY ACCOUNTS OF THEIR NATURAL HISTORY,

AND PROPER DIRECTIONS FOR TREATING AND MANAGING EACH PARTICULAR KIND:

The whole containing whatever is New, Interesting, and Useful, on this great and important Subject. Together with

The latest practical Facts, Discoveries, and Inquiries,

Which have been made by the most experienced and eminent Breeders, Amateurs, Farmers, and others, in the improving and increasing the Value, Utility, and Profit of every Sort of Domestic Live Stock. Also,

A FULL DISPLAY OF THE VETERINARY ART AND PRACTICE;

The several useful Breeds of DOGS and RABBITS; the Nature, Habits, and proper Management of all Kinds of POULTRY and PIGEONS; the necessary Culture of BEES and FISH;

WITH MUCH OTHER USEFUL AND IMPORTANT INFORMATION ON RURAL PRACTICE AND ECONOMY.

ILLUSTRATED BY A SERIES OF

FINE ENGRAVINGS OF THE MOST IMPROVED ANIMALS OF THE DIFFERENT SORTS,

AFTER DRAWINGS MADE FROM NATURE EXPRESSLY FOR THIS WORK.

BY R. W. DICKSON, M. D.,

Author of "Practical Agriculture;" "The Complete Farmer, or General Dictionary of Agriculture and Husbandry;" and numerous other Works on Rural and Political Economy.

VOLUME THE SECOND.

FELIX QUI POTUIT RERUM COGNOSCERE CAUSSAS.—VIRG.

LONDON: PRINTED FOR THOMAS KELLY, 17, PATERNOSTER-ROW.

MDCCCXXIV.

LONDON:
Printed by WILLIAM CLOWES,
Northumberland-court.

560030

AN

IMPROVED SYSTEM

OF

LIVE STOCK AND CATTLE MANAGEMENT;

WITH THE

MEANS OF PREVENTING AND CURING THE DISEASES, ACCIDENTS,

&c. &c.

CHAPTER II.—LIVE STOCK.

SHEEP, *continued.*

SECTION XIV.—*Nature and Cure of their Diseases.*

THESE animals are subject to various diseases, which should be carefully attended to as soon as they show themselves; for the least neglect or delay in this respect may be soon attended with fatal consequences.

The appearances which denote sheep to be in a proper sound state of health are a rather wild or lively briskness, a brilliant clearness in the eye, a florid ruddy colour on the inside of the eyelids and in what are termed the eye-strings, as well as in the gums; a fastness of the teeth, a sweet fragrance in the breath, a dryness of the nose and eyes, breathing easy and regular, a coolness in the feet, dung properly formed, coat or fleece firmly attached to the skin and unbroken, the skin exhibiting a florid red appearance, especially upon the brisket.

These are the principal appearances which prove them to be in a sound and proper state of condition.

CATARRHAL FEVER, OR THE EFFECTS OF COLD AND CHANGE OF SITUATION, &c.

This is a state of fever that not unfrequently takes place, and which is sometimes extremely destructive of sheep from the very early age of the lamb to that of the oldest grown sheep. Cold and change of situation are very productive of the disease, though but little attended to in many cases, and consequently often carry off vast numbers of the lambs and old sheep, of flocks in particular situations and circumstances. The lambs are in many instances very quickly and suddenly destroyed by too severe an exposure in this way; and the older sheep often soon become in the state of fever, are greatly enfeebled, and at last so exhausted and worn out by such attacks, that if proper care be not taken, they in many cases fall down and die, naturally, as it is usually supposed. The consequences of such affections should therefore always be well regarded, and as much as possible prevented by the choice of proper shelter and protection in the places where they are to be fed and pastured, as it is found that whenever they are changed from a warmer to a more cold climate, or the contrary, they become liable to be attacked with this sort of feverish state, which is highly injurious to them in many ways, as laying the foundation of internal glandular complaints, and pre-

venting the proper thriving and health of the sheep.

The appearances which shew the presence of this sort of fever, whether in lambs or older sheep, are a kind of cold shivering state of the body, which is succeeded by heat, with a quick fullish feel in the pulse, great loss of power, dullness and distress in the countenance, cough, and a want of inclination to feed and pasture in a proper manner, with a constant running at the nose and wateriness in the eyes; and, ultimately, much wasting of the whole frame, the older sheep mostly separating from the flock, and creeping into low, warmer, solitary places, and the lambs losing their usual liveliness, getting thin, and becoming at last in quite an empty exhausted state.

In the removal of such fevers, more depends on a judicious change of circumstances and proper management than upon any remedies that can be administered to the animals; care should, therefore, be taken that the lambs, as well as the old sheep, at first be changed, so as to have more shelter and protection; and when the fever is removed, a better and more nourishing keep than usual should be provided for them; as by such means all that is wanted will in general be gained, especially where such keep is taken in sufficient quantity.

But in case such means are not sufficient for removing the disease and perfectly restoring the animals, the former may probably be effected by means of two or three grains of submuriate of mercury, ten or fifteen of antimonial powder, and a drachm or two of the nitrate of potass, being made into a proper ball, and given as there may be occasion. And an infusion of the following kind may be used with benefit in the latter intention, where the sheep or lambs are worth the attention and trouble:

Take of—Oak bark, coarsely powdered, two ounces and an half,

Colombo root and snake root, in coarse powder of each half an ounce; infuse them in

Boiling water, one pint and an half, for eight or ten hours, then decant off the clear fluid, and add of the

Diluted sulphuric acid, one drachm and an half; mix and make an infusion; about a small tea-cupful of which may be given to the old sheep twice a day, and two table-spoonfuls to the young lambs when necessary.

By some such means as these the sheep may often be perfectly restored, and the great and too frequent losses which occur in this manner may be well guarded against and prevented, to the no small advantage of the owners of them.

INFLAMMATORY FEVER GENERALLY, AND WITH LOCAL AFFECTION; BLOOD OR BLOOD-STRIKING, AND SICKNESS.

This is a disease which in the first state or form is frequent and well known in most places, but is most common in rich short improved pastures, and where sheep are put upon clovers and other such rich food in the more early spring season. It is very suddenly and extremely fatal in many situations and circumstances, and seems to be the effect of general inflammation, produced in this way or by some other such means.

The appearances that distinguish it are, that the sheep separate from the rest of the flock, stand stupid and dull, heaving and panting much and holding down their heads, their eyes seem heavy, their breathing is short, they are convulsed, they foam at the mouth, and sometimes they drop down dead in a few minutes after the attack. On opening their bodies, there are the marks of strong general inflammation, and a very disagreeable smell, with much lividness in the parts.

In the cure, in all such cases, the first thing which is to be done is, to bleed as speedily as possible, so as to fully reduce the inflammatory state; and then to keep the bowels well open

by saline purges, such as an ounce or more of the sulphate of magnesia, dissolved in half a pint of strong infusion of senna; or, where the sulphate cannot be had, two or three table-spoonfuls of common salt may be made into a solution in the same way. The bleeding should always be performed in the neck veins, as sufficient blood can seldom be got from those of any other parts.

In the other state or form of the disease, which has much similarity to this, there are high local inflammatory affections of different internal parts, as the *brain*, the *chest*, or parts about it, the *stomach*, the *bowels*, the *liver*, the *kidneys*, the *bladder*, and some others. It is equally and as quickly fatal to sheep as the above; as it is said, by those who have treated on it, that it frequently happens, that out of a small flock of young hog-sheep, the whole of which, the preceding evening, have appeared in a perfectly healthy state, not fewer than six, seven, or more, have been found dead the next morning, having their feet under them, in some instances, as they laid down to rest. It may be said to be, for the most part, a disease incident and peculiar to hog-sheep, and which, the sounder they are bred, and the higher they are in condition, the more they are exposed to its attacks; the more desperate are its ravages, and the sooner are the sheep destroyed, when seized by it. Some sorts of sheep are supposed to suffer more from it than others, as the heath than the white-faced, and fine-woolled breed. It is not unusual, in severe attacks of it, for a tenth of the young sheep to be destroyed by it. It is not, however, supposed half so fatal in some sorts of management of such young sheep as in others, as where they are permitted to feed with their mothers, instead of being hirsaleds, or kept and reared by themselves; since in this latter method, though they become more similar in shape, size, and condition, they gain a dullness and inactivity of disposition, which does not leave them for some time. They also collect and feed improperly, are incapable of sheltering themselves and finding their food in storms and snows; and are less able to sustain the difficulties of the winter, losing the good state of condition in a speedy manner, and becoming enfeebled. While, in the other mode, they are taught by their mothers to shelter themselves better in severe and stormy weather, to feed more properly at all times, and by these means to become more lively, active, and stronger, suffering less from the severity of the winter season, and getting a better and more firm state of body.

Though some sheep occasionally die of this disease at all periods of the year, its great destruction is said almost wholly to be confined to the winter season; beginning sooner or later, according to the state of the weather. When many die previous to the time of smearing, it shows that great loss may be expected from it during the winter. It rarely occurs in any great degree until frost has set in, and checked vegetation considerably; and it is the most destructive in the month of November. In sudden changes of mild weather to frost, or of frosty nights to days of rain, especially when attended with hoar frost, it is remarkably fatal; but it becomes less frequent as frost steadily sets in.

The disease may directly be brought on by feeding too much on frozen grass, or on such as is greatly loaded with hoar-frost, as the effects of grass eaten in such a state, on the tender bowels of hog-sheep are, in some measure, similar to those of frozen potatoes eaten by neat cattle, which directly set loose large quantities of hurtful airs, that bring on inflammation and mortification in a speedy manner.

Some other similar causes also bring on this disease, as the eating fouled, coarse, decayed herbage, plants, roots, and other such matters. Pet and housed sheep are found to be equally subject to it with others.

The hardest, driest, and soundest sort of land, as that of the ley-heathery kind, is said to be the most liable to the production of the disease, as such pasture is supposed to have the same effects upon sheep that corn has upon horses; their bellies thereby become lighter, they run faster, they keep their wind longer, they get a hot, dry, and costive habit, and are more subject to inflammatory diseases. The ley-heather plant mostly grows in bushes, and is very strong, and of a heating quality, while its roots are surrounded with grass of the softest and most delicious kinds; and, in fact, all sorts of pasture, one part of which is fine, and another coarse, are liable to occasion great losses from this disease. There is constantly much danger in the sheep filling their stomachs with raw, watery, fouled food.

The general appearances by which this disease is known, where its progress can be distinctly marked, are, that the sheep seems to become in an uneasy state, ceases to feed, but, when it has the convenience, drinks frequently. If closely looked to, its eyes will be found to be half closed, dull, inflamed, and watery; the mouth, tongue, and skin, are dry and parched; the pulse is strong and frequent, and the breathing quick and difficult. The sheep grinds its teeth, lies down, and rises up in a repeated manner, or stands motionless, with its head hanging down and its back erect, or creeps away from its companions with a slow and stiff gait, to the edge of some precipice, holm, or other retired place; where it lies bleating, or, in some measure, screaming, from the agony it feels; its wool clasps to the body, which swells sometimes to such a degree, that the rim of the belly gives way, and strong convulsions are succeeded by death in a few hours from the time of the first attack of the disease. Some sheep will live for several days, though rarely a week, unless they get better, which but seldom happens. In the whole of this time there is scarcely ever any passage through the bowels, the urine is small in quantity, and deep in colour, and the blood is completely black, and so thick, that when a vein is opened, scarcely more than a drop or two oozes from the cut part.

On inspecting the body after death, almost every part of it displays appearances more or less strongly or distinctly marked, of inflammation and mortification, or a tendency to a state of putrefaction.

There are apparently two distinct states of the disease, as it exists in different parts of the system, as when the muscular parts are the most affected, it is supposed to be in the flesh or blood, and when the stomach, intestines, or other of those parts, to be in the reid or bowels; and in the latter of these cases, there is sometimes a large effusion of bloody serum into the cavity of the belly.

In these cases the appearances differ according to the nature of the parts which are locally affected.

When the local *inflammation* is in the *brain*, in some instances, and those the most violent, or in the stomach and bowels, no *one* part appears to be more affected or acted on than another. Over the whole there is spread a general redness, and the flesh of the sheep is quite soft and tender, soon putting on a greenish cast. The brain being greatly acted on, and participating largely in the affection, having its vessels red and turgid, displaying, with the exception of the blackness, the same appearance as that

noticed below in the bowels. In all cases where this is found after death, the disease is said to have been very quickly fatal, rarely exceeding four, or at most six, hours, from the first apparent affection of it.

When the inflammation affects the membrane lining, the breast, or chest, the case is not so readily discovered in the living sheep; nor does it affect the carcass so greatly if blood be let. There would seem to be a tendency in the blood itself to decompose and putrefy, and frequently there are appearances of inflammation on the coat or membrane that lines the breast; or on the part termed the diaphragm, and the affection has a great similarity to the pleurisy in the human subject.

In the above two cases, it is remarked, that the whole body is much hoved or swelled, that the fore legs are evidently the worst, that the kidneys are in the same state of mortification as in the two following cases of the disease; that the appearances and the smell are the same, that the sheep are taken off by it in a short space of time, and that it is the same or a similar disease to the *black spauld*, which is prevalent among young cattle in the west of the northern part of the island, when the grasses fail, and they begin to feed on fodder and herbage of the dry kind. It is noticed, too, that the whole of the old sheep that die of the disease, and likewise the hog sheep which fall in the spring, are destroyed by this state of it, though particular sheep die of it at the same season or time; when they are taken off in great numbers by the bowel sickness, or disease seated in that part, or the reid. The mortality is, however, on the whole, not nearly so great, nor indeed more than one tenth or twentieth of that caused by the other state or form of the disease.

When the disease is in the latter state, or in the reid or bowels, the parts affected have the following appearances of an inflammatory nature. When the inflammation has its main seat in the stomach, the belly is prodigiously swelled, the carcass is greatly discoloured, and a sour pituitous matter is diffused through the whole body, especially the fleshy parts of it. The least change seems to take place in the fat; yet though it melts into grease, it has constantly a bloody appearance, from which it cannot be freed. The body, on being opened, emits a strong sulphureous smell, which is characteristic of the disease; whence it is sometimes called the *stinking ill*, and the stomach and bowels are vastly distended with air, having the same intolerable fœtor. There is a general redness pervading the whole bowels. It is seldom that either of the two first stomachs of the sheep become the particular seat of the disease; the third is occasionally so; but the fourth, and especially that portion of it approaching the intestines, professionally distinguished by the name of *pylorus*, is constantly much thickened, inflamed, or even in a mortified state. The food, met with in the stomach, especially the third, is quite in a dry state, and may be crumbled to powder between the fingers. There is a completely mortified state of the kidneys, which have the appearance of a mass of putrid gore. There is also much affection of the liver; but the heart and lungs only partake, in some measure, of the general redness. This is said to be the most common and usual form or state of the disease; it is peculiar to hog-sheep on frost first setting in; it is not to be distinguished in the life-time of the sheep, except by the excessive swelling of the belly, and it is almost always fatal, in a speedy manner.

When the local part of the *inflammation is in the bowels*, there is the nearest resemblance in

the disease to that which has been just described; but instead of the stomach, the small guts are inflamed and mortified. The carcass is observed to be much less swelled, and not nearly so blue and putrid; with the exception that the chewed grass which is in the maw is very stiff, and almost quite solid to the feel, the stomach is scarcely in the least affected; but the small guts are mortified, black, soft, and nearly quite rotten, the inflammation having evidently originated in one of the latter folds of these. In a few instances, a small fold or doubling in the intestines has been noticed, which, by some wind passing through them, had forced its way through the thin texture that covers them, and by which the fat hangs; this was full of air, perfectly black, and mortified, as were several of the folds above it; so that it has been plausibly conjectured, that this state of the disease is occasioned by a twist or interception of the intestines, caused by increased hardened lumps of purl or dung obstructing all passage through them. It is supposed to attack hog-sheep only, which have plenty of grass when the weather is mild, in the time of snow-storms, when their walk is much circumscribed, and when they are confined to the tops of heather, bent, and other dry sapless food of the same nature. This case is not so speedily fatal as the former; the sheep sometimes linger a day or two in great pain and agony, without seeming to be much swelled or enlarged.

When the *inflammation is in the bladder*, as sometimes happens, the main seat of the disease is in that part, and the appearances have a resemblance to those of the third case or inflammation of the stomach, the putrid taint of the carcass being in a great measure the same. Independently of this cause, lambs sometimes die of inflammation of the bladder, in the course of the first ten days of their lives: this, however, only takes place in cold and barren seasons, in cases where they lie too long in one place. The shepherd should, consequently, be attentive to this point, and by properly attending to the feeble and exhausted lambs, they may often recover, especially if they be affected with a trembling of the whole frame.

When *the inflammation is chiefly on the coat that lines the belly*, or that which covers the whole of the bowels, and lines that cavity; sometimes, on opening the belly, the whole bowels are found swimming in bloody water, although none of it is contained in the intestines. The gall bladder is shrunk and contracted to a scarcely discernible size, and is nearly empty of bile. The membranes that connect it with the other parts are inflamed. The urinary bladder is constantly empty, but not found ruptured, as suggested by some. The smaller cavity of the stomach has some purple spots on it, which are thicker than the rest of its substance. It may be known in the life-time of the sheep, by the swelling hanging low, in the place of rising up, at each side of the back, as in the case of the stomach being affected, and by an evident fluctuating feel when one hand is laid flat to one side of the belly, while the contrary side is struck by the palm of the other.

In respect to the cure or removal of these different states or cases of the disease, from the sudden fatality of it in most cases, little can be effected, as a large proportion of the sheep that are attacked, are carried off before they are discovered to be affected; and in some cases, where they do recover, they are left in such a state of weakness and exhaustion, that they have little chance of withstanding the severities of the winter and spring seasons. In cases of these kinds, where a cure is at all pos-

sible, it can evidently be only effected and thoroughly accomplished, by the use of such means as have a tendency to counteract, lessen, and completely remove inflammation; or the too great action in the parts, which are the main seat of the disease, as well as over the whole body; and those which tend to invigorate, strengthen, and support, the system after the inflammatory state has been overcome. Instant full bleeding, as in the first or general inflammatory state, is principally to be relied upon in the former of these views; which is to be carried on in proportion to the state, condition, and size, of the sheep, the operation being performed as near to the seat of the disease as can be done, as in the veins of the neck, the tail, or the inside of the fore legs; and in the angle of the eye, when the disorder is chiefly about the head or brain, and chest, the stomach, bowels, or kidneys; and to this, the practice of purging may be added, which will assist greatly in reducing the state of inflammation and fever that may remain. This may be best done by a solution of sulphate of soda in a hot infusion of senna, in the proportion of an ounce or more of the former to a quarter of a pint of the latter. Common salt, in the quantity of two ounces or more, has been found useful in some cases. Castor oil, in the dose of two ounces and upwards, sometimes answers well in the same intention; and the smoke of tobacco may be thrown up into the bowels as a clyster. Nitrate of potass, as a cooling remedy, is occasionally beneficial in the dose of from one to two drachms. Where, in these practices, the blood flows in a free manner, and purging is fully and effectually produced, there is considerable chance of the recovery of the sheep. In the latter of the above views, the giving of strong decoctions of bark, and aromatics, with other tonic substances in the quantity of a small tea-cupful at a time, with boiled hay, and other kinds of good food, the sheep may have a chance of being soon restored to the healthy state.

The practices of curing the disease, by running the sheep violently, bathing them for a few minutes in warm water afterwards, and then letting them have some softening material, as a clister or in other ways, ought always to be wholly avoided, as dangerous and destructive, though they have been strongly advised by some, who seem not to have well understood the nature of the complaint.

In all cases, where inflammation takes place in any of the above parts, from other causes than such as have been described to produce these affections, and which not unfrequently happens, in some situations of sheep, bleeding must be practised as near to the particular part as possible, after which the solution directed below may be given.

Take of—Sulphate of magnesia, one ounce, or more; dissolve it in

Infusion of senna and ginger, three ounces,

Syrup of buckthorn, two drachms; mix and make a solution, which is to be given milk-warm as there may be occasion. But in milder cases of this sort, the following form may sometimes be more suitable and proper:

Take of—Castor oil, two ounces, or more, rub it well with mucilage, as much as necessary,

Subcarbonate of potass, one drachm,

Infusion of senna, two ounces,

Treacle, half an ounce; make them into a mixture, to be given in a little warm gruel until it operates.

By either of these means the stomach and bowels of sheep may be conveniently opened in such inflammatory cases, and such states of the parts be often readily removed.

As from the suddenness of the fatality in the cases of sickness, less is capable of being done in the way of cure, than in many other diseases, more attention is necessary to be paid to the

prevention of them. This has been seen to be much promoted by a different manner of managing the young sheep in rearing them with their mothers; and a great deal depends, too, in this intention, upon the provision of a due supply of green succulent food of some kind or other, for the period of the attacks of this complaint; as all kinds of keep, which preserve a constant growth and verdure, are effectual preventatives of its attacks; such as clover, turnips, fine sea marsh, and the tathy dark-coloured grass, on drained coarse sort of land of the same nature. A reasonable use of turnips, either by the sheep eating them in the field, or by pulling and throwing them on barren spots of ley ground, and turning the sheep an hour or two daily upon them, is likewise said to be nearly to a certainty a preventative. The advantages of these easy, simple, and ready modes of prevention in this disease, are greatly encouraging to the sheep manager.

In preventing this state of the disease, attention is also to be directed to shelter, the nature of the produce of the land, and the manner of feeding the sheep upon it. The disturbing the sheep early in the morning, is likewise thought to be beneficial with the same view, as preventing the danger of external cold on them, and relieving the distention of the bladder, where that occurs. Bleeding in the jugular vein, at a certain period, as late in the season, is also considered by some store-masters, as almost an absolute preventative of the disorder.

These latter cases of this form of the disease have been mostly considered under the title of *braxy;* but which seems to have little meaning in it, as it does not point out the nature of the affection.

AFFECTION OF THE HEAD AND BRAIN, PARALYSIS, OR LEAPING ILL.

This may be said to be an affection of such parts which is often very fatal to sheep, especially in the more northern parts of the island. There seems to be two states of it, one of which attacks and affects the poorer sorts of sheep in general; and the other, commonly those which are in the best condition.

The former is said to be now more rare than formerly in those parts, so as in some of them to be scarcely known. It displays itself in the spring, and towards the end of summer, affecting sheep of all kinds and ages, but rarely or never those which are in good condition, chiefly existing on dry lands, with northern exposures, that are plainly overstocked, and on such only in severe dry springs, or when the early grass has been destroyed by frosts; and when no juicy or green food of any sort is to be met with by the sheep. Long-continued easterly winds favour its production; ewes being sometimes attacked with it in cold weather, even after they get fleeced. In which cases they become greatly reduced, particularly where many of them are heavy with lamb, or affording suck; and, if at such times they chance to get an overstretch in any exertion, or even a sudden start, or squeeze in the fold, they fall a prey to this disease in great numbers.

It is greatly fatal in some instances, and has formerly been thought infectious, though this can hardly be the case in reality, yet it is unquestionably the most destructive when it first shews itself among a flock; and when such animals are brought from a clean ground to one which is infested with it, a great many of them are certain of dying; those surviving it in one season being sure to be attacked the ensuing spring.

The appearances which mark this form or state of the disease are, that some sheep will fall down and die in a few minutes; others will lose the power of one side, and lie sprawling till they die for want of food; still others will lie shivering, and be very sick at times, until death closes the scene; and some will proceed a long time very lame, carrying occasionally one limb and then another, until they are also quite worn out. In some cases it seizes the whole body, when there is a general trembling; and, in others, affects the legs only, when the sheep instantly falls down, and the shaking, which is confined to these parts, is uninterrupted. In other cases, the sheep gradually loses the power of its legs and body, until it gets quite weak, constantly lying at last upon one side.

In the other state, the disease mostly shews itself in the summer months, and about the harvest season, especially in hot sultry times, arising either from the sheep being put into excessive action by some means or other, or by being over-heated in the run; in which case it usually displays itself, in a few hours afterwards, by the stiff neck, or some of the other appearances taking place. When, however, the sheep are exposed to much fatigue, it will come on, if the season be warm, without the excessive heating motion being produced. The *fattest* of the flocks are generally cut off by it. It frequently arises in consequence of some other disease, as the braxy, or sickness which is commonly a favourable appearance, and is never, in such instances, severe, or has the stiff neck attending it. On opening and examining the heads of those sheep which die of it, the vessels of the brain are found slightly tinged and red with blood, but which appearance is constantly the less the longer the disease has lasted.

This form of the disease is mostly confined to the sheep of the southern tracts of the above northern parts, being almost unknown to the sheep farmers of those more to the north. And in those places where it is prevalent, it is, in some instances, particularly fatal, the farmer frequently losing more of his flock by this alone, than all the other diseases combined.

The appearances that denote the presence of this form or state of the disease are, that the sheep turns somewhat stupid, and neglects its food, doses round, as in some local affection of the brain, and often leaps up, as if to clear some bush or dike before it; at times eating greedily, and then again refusing all sorts of nourishment for some length of time. It continues to leap frequently in the day, and the neck is often stiff, and turned to one side, which is probably a smaller degree of the same disease; convulsive spasms come on in the limbs, which make the sheep fall down, produce curious contortions, and at times run to a little distance; the body, in some cases, partakes of these, when the sheep turns or becomes wholly incapable of motion, perishing from want of food, which the jaws will not open to admit, being closely wedged together. It is unable, in this state, to follow the flock, and the wool claps to the body. It lies motionless for a long time, and at length dies. In those cases where the disease is not so violent, or the spasm of the jaw so severe, after lying motionless for some length of time, this contraction gradually relaxes, and the sheep will eat the whole of the food within its reach, although the power of the limbs be wholly gone. In such cases, the sheep will so completely eat up the whole of the grass, that the earth will be left quite red, bare, and naked, on the spot all round them.

In these circumstances, if the shepherd be

attentive, and carefully lifts them from one spot to another, and the season be pretty well advanced, they often slowly recover, and are again restored to the use of their limbs. When, however, they lie in this inactive state, if the weather be warm, maggots are very apt to be bred in them, and when not well attended to, soon destroy them.

In the cure of the first state of this disease, it will be necessary, where the sheep fall down suddenly, and there is danger of almost instant death, to bleed, by cutting the tail, or opening a vein in the neck, or on the inside of the fore thigh. By taking a suitable quantity of blood in this way, almost instant relief will sometimes be given to the sheep. Slight purging, in many instances, may also be greatly useful, which may be best done in the following manner:

Take of—Sulphate of magnesia, in powder, six drachms,
Submuriate of mercury, ten grains,
Root of rhubarb, in powder, one drachm; mix them into a fine powder, and give it in a little thick warm gruel as necessary.

By these means this state of the disease is in many cases readily removed.

In other cases, it is commonly best to take the sheep home, and feed them well with nourishing and strengthening kinds of food; when, in case a temporary looseness comes on, they recover speedily, and in no great length of time gain their usual strength and vigour of body. The practice of dipping or washing them in cold spring water, may sometimes be found very beneficial in less severe cases. Small doses of nitre may also occasionally be given, either with or without mild purgative substances, with great advantage. Salad oil, with a little spirit, and finely-powdered root of ginger, made into a mixture, has been found of service in some instances, rubbing soft or black sope into their backs, and feeding them with good ley hay at the same time. The use of a decoction of the plants commonly called, in some places, the Dewcup, or Healing Leaf, in butter-milk, has been found to be attended with success, in these cases, in the summer and autumnal seasons.

It is particularly useful, in these cases, to provide the sheep, in the early spring months, with sufficient shelter and food; to avoid overstocking, if the early grass has been blighted; and to pasture them in a rich park, or other proper place.

In the cure of the second form of the disease, as it has been seen that it arises from the oppression of the brain, in consequence of too much blood being sent to it by the more strong and increased circulation, the first thing requisite, on the disease showing itself, is, full bloodletting, in proportion to the state and size of the sheep, which will be more beneficial the nearer it is taken to the head, as from the veins of the neck, or from a well-known vein on the outside of the eye. It may, indeed, be taken from the tail or fore leg; but the veins of the head are considered the best to be opened in these cases. After this, the use of purgatives will be of advantage, in taking away the oppressive matters from the head, and in lessening the too great action of the vessels of it, and of the whole body. The best with this intention are such as these:

Take of—Sulphate of soda, powdered, one ounce,
Submuriate of mercury, six or eight grains,
Senna, in powder, two drachms,
Root of ginger, in fine powder, one drachm; mix them into a powder, which may be given in a little warm treacle and water as there may be occasion. Tartarized kali, in small quantities, with a few grains of finely-powdered jalap, answer the same purpose very well in some instances.

But a better remedy, in many cases, as acting more upon the skin and kidneys, and at the

same time allaying the increased heat, is that directed below:

Take of—Nitrate of potass, in powder, five drachms,
Subcarbonate of potass, half a drachm, or more,
Root of valerian, in powder, two drachms; mix and make a powder, to be given in a little warm gruel, and continued as long as necessary.

When the more active inflammatory state is gone, advantage has been gained by the use of two or three grains of sulphate of zinc, made into pills with a drachm or two of castor, and a little bread crumbs and sulphuretted oil.

When the animals are too far gone in the disease, and have lost all motion, they are best killed to save the carcass, which in this case is not much injured.

This disease is sometimes known by other names, as those of Trembling or Thwarter Ill, probably from the state and appearances of the sheep.

PARALYSIS, OR LEAPING ILL, IN LAMBS.

There is a case of lambs in which there is sometimes much loss, which seems to be an affection of this nature. It is sometimes of the lingering kind, and at others so speedy in its fatal effects, that the sheep are frequently dead before there is any suspicion of the disease. From the appearances which attend it, it has this name given it. In some cases of this sort of affection, great success has attended washing the lambs with cold water, or dipping them in it. And it is probable, that purging with small doses of submuriate of mercury, camphor, and rhubarb, may be used with advantage, if given in time.

WAISTING, PINE, OR DAISE.

This is a disease which is most common and severe in young sheep, and which is principally confined to particular districts, and tracts of country, where the land is very coarse, hard, dry, and heathery in its nature, and the product which it affords. It is a disorder which constantly attacks the best of the flock, and though the sheep continue to feed in the most greedy manner, they daily waste away, and ultimately become mere shadows. But though, in so far as the gradual wasting and reduction of flesh in the sheep is concerned, this complaint has some similarity to the rot, it is directly the contrary in its nature and cause; as that is well known to arise from excess of moisture, to be a state of debility, and to be marked by an extreme thinness of the blood; while, on the other hand, in this, the condition or state of the sheep is too high, the blood of it too thick, and its pasture too acrid and parched, so as to be productive of an inflammatory state or tendency to it.

The sheep in this disease are attacked with a sort of inflammatory state of the whole body, which is soon succeeded by a wasting of the flesh of the whole system, and great loss of strength. Some breeders suppose the seat of the disease is chiefly in the blood and bones; but it is more probable that it has its main affection in some of the internal lymphatic or lacteal glandular parts, as there is constantly great emaciation and weakness coming on after it. Cold and moisture are supposed, in some cases, greatly to assist in bringing it on, as well as in rendering the appearances worse; but the great evil may perhaps lie in the nature of the soil, or the manner of feeding the sheep on it.

It is, however, a disease which is not of a very dangerous nature, as on removing the sheep to soft grassy pastures, especially where they have lately been turned, they not unfrequently soon recover, and scarcely ever fail, in future,

to become excellent sheep, and remarkable for being healthy.

When the inflammatory state has been removed, in bad cases, by the use of nitre and mild purgatives, the wasting and emaciation of the body may be prevented or remedied, by small doses of calomel and soda; giving, at the same time, strengthening remedies of the bark, iron and steel kinds, when thought proper.

By these means the sheep will mostly be soon restored to their natural former state of body.

WATER IN THE HEAD, LOCAL DROPSY, GID TURN, OR STURDY.

This is a state of disease common among sheep, in which there is an almost continual turning motion in them. These affections are supposed, by some persons, to be a sort of local dropsy, or encysted collection of water in that part, and by others, to arise from causes of a different nature, as will be seen below. They are of great importance, equally on account of the frequency of their occurrence, and their constant fatality, unless where relieved by means of art. Some think them most usual in sheep that are too highly or richly fed; while others find that they generally affect hog-sheep during the spring and summer.

There seem to be two or three kinds, forms, or varieties, of these affections, as those where the water is confined in cysts, where it is not in any encysted state, and where there is no water at all present.

The causes are commonly believed to depend on too much exposure to tempestuous, severe weather, without due shelter, as in well-sheltered flocks few sheep are ever affected, and clothed sheep never. Some breeds of sheep are particularly predisposed to such affections, and will have different relapses of them; and horned sheep are stated by some store-masters, as being the most liable to them. It is also conjectured, from the appearance of small ant or nit-like *animalculæ* swimming loosely in the fluid of the cyst in large numbers, that some affections of the brain may be caused by them. And there is a firm conviction, that if such cases of these diseases were examined with minuteness in all their stages, by means of proper glasses, that whatever were their beginnings, the progress of them would be accelerated, by the power and activity of these *animalculæ* increasing equally in numbers and size.

Some persons have attributed the cause to an animal of the vermicular kind, seated under the horn, on either side the head. In whatever way these affections may be induced, the immediate cause of the appearances of them is, unquestionably, pressure on the brain, whether it arise from a collection of water, as in the two real cases or forms of such affections, or from accidental contusion, bony excrescence, or any similar cause, as in the false cases of this nature. But what gives rise to such watery collections, is not by any means so well decided. It is supposed probable, that inflammation of the brain may precede the effusion of them in the latter of the two first states or forms; but the manner of the formation of the cysts and hydatids in the first, is far from being thoroughly comprehended. It may be presumed, perhaps, to take place in consequence of the local debility in the part, and the action of such animalcules as have been noticed, if it be allowed that they have any existence there in the living state.

Such affections are neither infectious, nor peculiar to any sort of food or soil.

The following appearances point out the

different states, forms, or varieties, of such affections.

In the first, when a sheep is attacked, it ceases to improve, becomes dull, is liable to loiter behind, and separate from the rest of the flock. It does not walk straight forward, but often turns to one side, or dozes round in a circle. The eyes glare steadily in its head, and seem enlarged, from the pupil being round instead of oval, as is constantly the case, in the day-time, in healthy sheep. Its vision is impaired, and it is incapable of seeing any object that approaches it, until it be very near, when it starts away, and runs furiously without any aim. If caught, it is remarkably stupid, when liberated again. It follows eagerly, in dry weather, to that quarter from which the wind blows. It has great reluctance to passing water in any case, and cannot easily get through that of small brooks, yet mostly frequents places where the sound of it can be heard. Sometime after these appearances shew themselves, in the course, perhaps, of three weeks, on examining the head by pressing on it with the thumbs, a remarkable degree of softness is found at one part of it, where the skull appears to be wanting. In some few instances, no softness is to be discovered in any stage or period of the complaint; but in either case, if not relieved by proper means, the sheep loses the power of standing, and dies perfectly emaciated and worn out. This state or form of the disease lasts from two to twelve months; during which the sheep appears to be entirely deprived of its senses and is continually turning round instead of going forward, being said in some districts to be *paterish.*

On opening the head after death, an oval or round bag or cyst is found in it, lying between the brain and the skull, quite unconnected with any of the surrounding parts, and, in general, situated between or beneath the horns; these vary much in size, being sometimes no larger than a plum, but at others nearly as big as the egg of a goose. They are mostly filled with a clear water-like fluid, which is sometimes intermixed with a thin cruor, when it is of a glutinous or slimy nature. Accordingly, as the disease advances, the bag or cyst increases in size, and by its pressure causes the brain to decrease, while the skull, immediately over the bag or cyst, becomes soft and disappears, so that nothing intervenes between it and the integuments of the head. Sometimes, but only in those cases where no attempt has been made to cure it, there are many small bags or cysts, unconnected with each other, distributed through the brain.

In the second state or form of these affections, which is much more rapid in its progress than the former, there is a great degree of stupor comes on, in the course of a few days, which is followed by total blindness; but no sort of softness is ever found in any part of the skull.

In this case, the water is not contained in a bag or cyst, but is within the substance of the brain, in certain cavities of it, which are called its ventricles, and sometimes in the hinder parts of it, where it joins with the spinal marrow, in which instance it is wholly incurable in its nature.

In the last, or false, state of the disease, no water is to be found in the brain, but hard substances growing or arising from the inside of the skull; and it may be observed, that blows upon the head, in some cases, cause all the appearances which are met with in the real or true cases of affections of this kind.

In regard to the cure of these affections, as the natural termination of them is constantly fatal, except in some rare cases of recovery, in

consequence of accidental blows which have ruptured the bags or cysts, and their contents have been taken up by the absorption of the small glands, the sooner the sheep is relieved by art, if possible, the better, as the mutton in such cases is good. But although the practice, in such instances, is extremely simple, and often successful, a great many sheep are suffered to perish through neglect, or an ignorance of the means proper to be pursued.

The cure in these cases is to be attempted chiefly in one of three ways, as, in slight affections, by suitable remedies, which promote the absorption and removal of the watery or other matters; by tapping or drawing them away in some manner or other; or by opening the soft parts of the scalp and scull, and extracting or taking out the bags or cysts and their contents.

The first may be tried by having recourse to the compositions directed below:

Take of—Submuriate of mercury, or
Calomel, three, four, or more grains,
Root of squill, in fresh powder, five or six grains,
Bark of cinnamon, in powder, ten grains,
Root of rhubard, in powder, half a drachm.
Copaiba, as much as is necessary to make them into a ball; which may be given once a day in a little thin warm gruel.

At the same time let the sheep have the following powder every day or two for some days:

Take of—Supertartrate of potass, or
Cream of tartar, in powder, one drachm and a half,
Cinchona bark, in powder, one drachm,
Grains of Paradise, in powder, two drachms; mix and make them into a powder, to be given as above.

The business of tapping or drawing off the watery contents, in these cases, is usually executed by means of an awl, large corking-pin, or sharp small wire; but it might be more conveniently and completely done, by an instrument of the small trocar kind, with a little tube in it. In case the bag or cyst be seated any where in the crown of the head, the best and gentlest way is to tap, or let it off in the place where the skull is soft, the fluid being suffered to run out. In this process, if the instrument be not pushed too far, the sheep is not any thing the worse, whether it recover or not. It is not, however, uniformly successful in all cases, though probably more sheep have been cured by it than in any other method. In performing it, the sheep should be laid on its back, and the pin, where it is used, should be introduced in an oblique manner; and where the fluid follows, the cure is generally certain, and even though the fluid should not follow, if the bag or cyst be punctured, the operation is not unfrequently effectual.

Where a sharp, small, stiff wire, or the method of *wiring* is employed for this purpose, when the skull feels soft in the forehead, it may be done, it is supposed, by thrusting it up each nostril, until it stop against the upper part of the skull, which may seem a severe and hazardous practice, but which is, in reality, it is said, the contrary, as by far a greater number of sheep are cured in this way than any other, as it is a sort of last resort.

Where the disease is not at all to be felt by pressing with the thumbs, it is either seated in the centre of the brain, or behind, and nothing can be done for the sheep, except by means of the wire. The sheep are affected by this process, in proportion to the stiffness with which the wire passes up, as when there is much resistance they are very bad. As soon as the sheep is wired, it is proper to take hold of it, with both hands, behind the ears, and shake its head loosely, which empties the cyst or bladder, and the water, most probably, finds its way afterwards by the nose, as they frequently get better, though no water is per-

ceived to pass at the time by the nostrils. The sheep are made sick by it for the time, but become more disposed to amend afterwards.

In the mode of cure by opening the scalp and skull, and extracting the bags or cysts, and the matters contained in them, the work is to be performed in this manner: The sheep being properly secured, and the head placed in the most convenient position, having the part to be cut uppermost, the skin is to be divided by an incision an inch and a half long, crossed by another of the same length, at right angles to it. The skull, which is quite soft, is then to be carefully divided, in the same or some other better manner, until the bag or cyst with the fluid is clearly evident at the bottom of the opening, as is commonly the case. The soft skull is now to be turned back, or a bit cut out of it, so as to render the bag or cyst perfectly visible; which should be taken hold of by a pair of blunt forceps, and gently removed backwards and forwards, to loosen it from its connexions, which are generally very slender. This may likewise be effected by a crow-quill, or any blunt pointed small body, carried frequently round it. The sheep is now to be held by the nose, so as to restrain its breath, in order to force the bag or cyst from its situation; which the operator should continue to move and pull, stopping the breath of the sheep occasionally, until it is quite extracted. The skin is then to be laid down again neatly, and a tarred cloth tied over the wound above the dry lint, which has been folded and laid on it, the whole to prevent equally the cold at other times, and the flies in summer, from doing it injury. These dressings should be allowed to remain for two days, when they may be changed, and a bit of cloth, spread with some unctuous substance or tar, be applied on the wound if necessary. It may be necessary to change the dressing every two days for ten days or more, after which time, in common cases, it will require no more attention, being generally healed up in that space of time. The skull, for the most part, grows over it in about a month, and then acquires its usual hardness, and the sheep is equally healthy as if no previous disease had taken place. The senses return in a few hours afterwards, and the following day the sheep seems to be quite relieved.

Where the bags or cysts that contain the fluid have been in any way burst, as is sometimes the case, it is often difficult or impossible to extract the sacs. In these cases, the best practice is, to place the sheep in such positions as that the whole of the fluid may run out, washing the wounds with spirits, and endeavouring to extract, if possible, the remains of the sacs, then dressing them with a composition of tar and basilicon, or one of them, separately, and turning the sheep, which have now lost their stupid look, into good pasture.

Every thing which has a tendency to produce inflammation and irritation in these cases is to be avoided, as damps, cold, and other causes: and where the inflammatory or adhesive state of the parts prevents such cysts or bladders from being extracted wholly and entire, they may be opened, and have weak spirits or port wine thrown into them, which has sometimes been found to prevent the return of the disease. The weather is, however, rarely suitable for the purpose, being either too warm or too cold, both of which are improper and attended with inconveniences.

There are some other modes of performing the extraction of the cysts or bags in these cases; such as by means of a hot iron, which forms the opening in the scalp and scull, and a small hook which takes out the bag entire; and by a hooked knife, and a quill made spear-

pointed, and hacked on the sides, with the former of which the scalp and skull are raised over the part affected, to the size of about half-a-crown piece in the first, and rather less in the last, which is left attached as by a hinge at one side; while with the latter the cyst or bladder is sought for, and brought out whole, when the bone is put down again, and the part covered with a plaister. These modes are, however, probably less perfect and successful than the former.

The cases of breaking off the horn under which the disease is supposed to lie, when no external softness is to be met with or discovered are of the same nature.

Cures have also been said to be effected in the disease, by pulling or shaking the sheep violently by the ears, and then cutting them off; and much benefit has sometimes been derived from blistering the head fully, and inserting setons under the jaws and the parts about them.

In regard to the manual practices that are made use of in the cure of the disease, the first must often be uncertain, in consequence of the varying nature of the complaint; the wiring method must be frequently impracticable and hazardous, from the nature and formation of the parts, and the extraction be attended with not less danger.

Sheep, when put into hilly dry pastures, are said to be less liable to a relapse of the disorder than in other cases.

CONVULSIVE STAGGERS.

This is another state of this kind of disorders, and such sheep as feed in forests or other woody situations are the most liable to be affected with it. It mostly appears in the autumn, and is supposed to proceed from various causes, but which have not been yet well ascertained.

Improper sorts of food, the astringent leaves of the oak, and other such plants, and cobwebs much loaded or sprinkled with dew, have been each of them considered as causes of such affections. It has lately, however, been understood to arise from the effects of a poisonous grass upon the stomachs of these animals, the *lolium temulentum*, which is the only one of that nature or sort, which is met with in certain places, and which grows only in those situations where the staggers are the most prevalent.

In case it continues for any length of time in the same individual sheep, it is apt to prove fatal.

The appearances which mark such complaints are, that they are more violent during their continuance than those in the above-mentioned cases of this disease: that the sheep after staggering for some time falls upon the ground, when a general trembling comes on over the limbs, which are highly convulsed, and quite insensible to every thing. While the fit continues, the sheep throws its body into various positions, and sometimes rolls to a considerable distance. This state continues for a quarter of an hour, sometimes for half an hour, or even for an hour. When the sheep rises again, it seems quite bewildered and lost, until it regains the flock, when it continues to feed tolerably well until another fit seizes it.

Much depends upon a change of pasture in effectually performing a cure. Something may, however, be done, in addition to it, by the use of such remedies as the following:

Take of—Camphor, rubbed into powder, half a drachm,
Hard opium, fresh powdered, two grains, or more,
Castor Russia, ten grains,
Root of valerian, in powder, one drachm and a

half; mix and make them into a powder, which is to be given once a day in half a pint of warm gruol.

Bark and other strengthening substances may likewise be had recourse to at the same time, in pretty full doses, where the sheep are worth it.

GLANDULAR AFFECTIONS IN THE LUNGS, WASTING, OR ATROPHY.

Sheep are liable to have their lungs affected with disease in different cases, and to be greatly distressed and reduced in their flesh and strength by it.

In such cases there is mostly a troublesome hacking or hoosing sort of cough, with great difficulty of breathing, and constant holding down of the head. The disposition to feed is much impaired, and there is a continual wasting of the body. On opening the body after death, the lungs are found in different states of decay, being sometimes almost wholly destroyed. In the whole of their cellular substance, there are often a great many round white knobs or knots of different sizes, which, in the parts most diseased, are commonly swelled into a sort of bags, which are filled with whitish matter of a purulent nature. Some of these bags are very large, and that side of the lungs in which they are situated, is nearly destroyed, a sort of membranous bag full of matter being left in their place, which is of a thinnish nature, and which is coughed up at times, and which also produces the difficulty of breathing. In cases where the swelled tubercles or parts are thus situated, the lungs mostly adhere to the side of the ribs, which is not usually the case. Such tubercles, in lambs and young sheep, are sometimes seen scattered through the substance of the lungs, and have the appearance of heads of large pins. In common, the left side of the lungs, or that in which the heart is placed, is the most affected with disease. The lungs are sometimes found much swelled, and water collected about them. This state of the lungs is often connected with other diseased states of sheep, as those of the rot, and other diseases.

INFLAMMATORY OBSTRUCTION IN DIFFERENT INTERNAL PARTS, OR RED WATER.

This is a disease of the inflammatory cast which takes place among sheep in the autumn or winter season, while they are feeding on turnips, cole, clover, or other rich succulent roots and grasses. It is frequent in many districts and situations among the sheep feeding in this manner, attacking those first which are in the fullest condition, which, if not soon relieved by proper means, are often quickly carried off; and probably arises from eating too fully of such food, Where the nature of the complaint has been examined after death, it has been found to proceed from inflammation in some internal part, as the stomach, bowels, kidneys, ureters, or about the neck of the bladder; where there is a sort of red or blackish grumous fluid matter left behind. While feeding in the above manner, the bowels are, in some cases, liable to become greatly loaded with sandy and other filthy matters, which tend much to increase the inflammation. The eating too largely of turnips in wet seasons is, however, mostly the cause; but the disease may arise, in some cases, from the sheep being let out of the fold when the ground is much covered with hoar frost, as well as from their feeding in the oat-ershes in the early autumn, when the young plants of that kind are strong. As the loss in these cases is often very considerable, as soon as the disease makes its attack among sheep fed in this manner, no time

is to be lost in putting an end to its destructive ravages.

The disease is known in these cases by the great uneasiness of the sheep, its want of power or inclination to feed in the usual manner, and by its becoming solitary, and lying or falling down on some spot in the pasture.

The intention, in the cure of such cases of disease, is, to lessen and remove the inflammatory state without weakening the animal too much, which may probably be best done by suitable bleeding and mild purgatives, such as the sulphate of magnesia, in boiling water, in small doses, or castor oil and a little oil of turpentine. Solutions of nitre, too, may be useful in some cases. But where the remedy is to be given to many sheep at the same time, the mixture directed below may be more ready and convenient, a small wine-glassful being given to each, by means of a contrivance proper for the purpose, the sheep being folded in readiness a little time before, and left for a short time afterwards:

Take of—Nitrate of potass, in powder, three ounces,
Sulphate of magnesia, four ounces; dissolve them in hot
Infusion of senna, one pint and a half,
Oil of turpentine, two ounces and a half, well rubbed with mucilage to which the above solution is to be gradually added, so as to incorporate the whole into a perfect mixture, to be kept for use in the above manner.

A strong solution of common salt in the same infusion would answer very well in many cases.

In case many sheep are daily carried off by the disease, the use of the mixture should be continued for several times, at the distance of a day or two.

Should the increased state of black-water occur, or the disease assume that form, it is to be wholly prevented, according to some opinions, by the use of a tea-spoonful of the elixir of vitriol, in a tea-cupful of water, given to each sheep in the morning, and letting them be cotted or housed in the night time.

The disorder, in both states, may probably be prevented, by allowing the sheep a small quantity of hay to counteract the wateriness of the turnip; as half a pound, or even less, may answer the purpose, when given daily to each sheep. And the disease may perhaps frequently be wholly prevented, by only allowing the sheep to feed a short time at first on such rich food, and gradually letting them have it more freely as they become used to it; turning them, in the intervals, into very bare grounds, where there is little that can be eaten, and letting them be at suitable times moved sharply about, in order that they may be well evacuated and emptied.

Where the disease has actually made its attack, and the sheep still survive, the same remedies may, in some instances, be given with benefit.

INDIGESTION OR AFFECTION OF THE STOMACH.

It not unfrequently happens that sheep, especially in the spring and summer, when there is plenty of food of the succulent and other kinds, are attacked with pain and great uneasiness in and about the stomach, from the want of due mastication and digestion. These disorders are very commonly brought on by the taking in of such matters in too large quantities, so as to overload and distend that organ, and occasioning the consequent incapability of re-chewing them in a proper manner, as well as from the local debility which is thereby caused in the part itself. They are sometimes produced by the loss of power that is caused in the part, as well as in the whole body, by too long fasting and over-hard driving, while on the road or in other cases. The cropping of

improper sorts of herbs and plants, in some cases, may likewise be productive of them; and they may arise from many other local and general causes.

In whatever way these disorders are induced, it becomes necessary, in different cases, to remove them by the use of such remedies as may strengthen the power of the organ itself, and that of the whole body, by exciting them into greater activity; and causing, in particular, a more regular performance of the functions of the stomach. When power and action are wanted in the stomach and bowels, the following drink-powder may be found of great benefit:

Take of—Cinchona bark, in powder, one drachm,
Cardamon seeds, in powder, half a drachm,
Root of ginger and carraway-seeds, in powder, of each one drachm,
Prepared chalk, in powder, two drachms; mix and make them into a powder, to be given in a little weak spirit and water, just warm, as there may be occasion.

The form directed below may answer better in some cases:

Take of—Subcarbonate of potass, in powder, half a drachm,
Subcarbonate of ammonia, in powder, six grains,
Guiacum, in fine powder, one drachm,
Powdered root of rhubarb, one scruple; mix them well, and give the powder in a little warm ale and gruel in the morning.

These may be found very effectual remedies in many cases of the disordered state of the stomachs of sheep.

BOWEL DISCHARGES, LOOSENESS, DIARRHŒA, OR SCOUR.

Discharges of this kind from the intestinal canal are common among sheep; especially such as have been greatly weakened and reduced by poor and deficient keep in the winter season. These sheep, on their being turned into good pastures in the early spring, when they begin to send forth their juicy grasses and rich herbage, cannot resist the effects of the great change in such a state. In consequence of which, great loss is frequently sustained in some situations, as such soft, juicy, tathy, pasture-grasses, act so forcibly on the bowels of sheep as soon to produce complaints in different cases.

The young hog-sheep, as well as the lean old sheep, are liable to be attacked by these diseases; the appearance and progress of which are influenced, in some measure, by the earliness and wetness of the season. They usually begin in the early spring, and disappear in the summer, when the grass-plants become finer and more dry. In common, whenever the cause of such complaints is removed, the sheep begin to thrive and get into condition, rarely experiencing a relapse the same season, In some cases, however, these disorders continue for a length of time, but are seldom fatal, except where the sheep is previously in a great state of debility.

In some other cases, these kinds of purgings are not only produced by cold and damp, but likewise by change of food, from healthy and dry, to moist soft pasture, or from poor and barren places, to such as are rich and fine. They are sometimes, too, the consequence of other disorders, as collections of matter, yellows, &c., which they not unfrequently carry away.

OTHER STATES OF SCOUR.

Besides this, there are other states or forms of these sorts of discharges, as those of the *white*, the *green*, and the *yellow*, skit or scour; the two former of which are diseases of the more violent of these kinds, that affects the older sheep, being supposed to arise in consequence of their feeding upon putrescent

vegetable matter of the rich root kind, such as the shells or hulls of turnips, which have been left on the feeding lands, and from some other such causes; the white also often affects lambs, as will be mentioned hereafter. The green is mostly brought on by change of keep from poor to rich, or from the hard keep of winter to the flush of grass in the spring or summer. The last, or yellow, is a disorder of young lambs, that is caused by the milk, which never shews itself in hard seasons, but solely when the weather is warm, genial, and growing, with plenty of young new grass. It is not found to affect them after they are three weeks old, being understood to arise from their sucking more milk than they can digest. There is a scour or skit, also, which sometimes happens to lambs at the time of their first taking to eat grass, or when just weaned; in consequence of the change that takes place in the stomach, as well as occasionally from cold and damp.

There is, likewise, another disease of a similar sort, far more violent than any of the above, which is that which may be termed the

DYSENTERIC, OR CONTAGIOUS SCOUR.

This is a disease which is not peculiar to any soil, but which appears most frequently, and spreads most rapidly, in situations where the pasture is soft and grassy. It is constantly produced or increased by improper management, as working among the sheep inconsiderately in hot sultry weather, and in crowded folds. It breaks out the most frequently, at such times, as when the sheep lie for some weeks, in the hot summer months, upon the same spot of ground for some time daily. Indeed, from whatever cause, when sheep lie upon the same spot until the ground turns foul, in case the weather be soft, sultry, and warm, with thundery appearances, this disease is greatly to be dreaded, and is epidemical in a very high degree.

But though this disease, in the first instance, is produced or increased by improper treatment of the animals, it is highly contagious, and rapidly spreads from individual to individual, and from flock to flock, so much so, that it is supposed, if a flock, which is much infected with the disease, lie between a sound flock and the wind, although at the distance of half a mile, the sound flock will catch the infection. In consequence of which, when the disease breaks out, all the managers of sheep in the vicinity have cause of alarm, as their flocks often catch the infection, in spite of all their efforts to prevent or guard against it.

This is a malady of a very dangerous nature, which, on a soft soil, kills the greater number of those sheep which are infected with it; but which, in a dry hard one, is less fatal and less contagious.

The appearances which distinguish the different forms, states, or kinds, of these scouring discharges from the bowels, are these:

In the first, the sheep become dull, drooping, and dejected in their appearance; there is a loss of inclination to feed, with a frequent griping teasing pain in the bowels, and a slimy loose discharge of their contents, with a gradual wasting and loss of strength, where the disease is long continued.

In these cases, on opening the body after death, the bowels appear white and bleached, though in some places streaked with red; and contain, as well as the stomach, in general, nothing but air. In cases where the disease has been severe, or long continued, the internal coat is something abraded or rubbed off from the intestines, and even from the fourth stomach. The carcass is completely wasted and emaciated, no fat being found on the

bowels, or even in other parts, for if there be it has lost its unctuous nature, and been converted into a substance of a white or tough kind.

In the second and third states, there is a white or green scouring, slimy discharge of the more violent kind frequently taking place, which is attended with much pain and uneasiness in the bowels. The sheep are dull and inactive, with little disposition to feed properly, the ears hanging in a slouching manner, and the pulse weak and quick.

In the fourth, the lamb is said to be sick of the milk, when it appears quite spiritless and dull, with its ears, instead of being upright, lying apart on its head; it is very lank in the sides and belly, and its breathing is short and unequal. These appearances are succeeded by a purging of a yellowish milky-coloured matter, which, in some cases, comes on before the disease be noticed. In others, the lambs die without having had any, or only a little, discharge of excrement. The carcasses appear well fed, the excrement in the intestines, which are somewhat swelled, resembles in colour that passed at the anus, while the stomach is particularly full of milk in the coagulated state.

In cases where lambs get too much milk in sucking, it is liable to become purgative, from its not being properly digested, or not undergoing the necessary process in the stomach; in consequence of which, many of the best of them are often taken off, and a loosness or continued scouring is sometimes brought on, that has the same fatal effects among them, where proper care is not taken to remove it. These are frequent in the more early spring season.

In these instances, the disease is apt to become more fixed, the passages being attended with a more full discharge of mucus substance from the bowels, with greater pain and griping, the young lambs continuing daily to pine away and decline in flesh.

In the fifth, or grass-ill, nearly the same appearances are present; but the discharges are sometimes of a blackish cast, and the state of the digestion seems much impaired.

In the last of these cases of disease, the sheep, when it becomes affected with it, acquires a sickly look, its ears drop and hang low down, its eyes are languid, and its wool claps to the body. It continues for some time to follow the flock, but commonly stands in the same position, looking to the ground. It frequently lies down, but soon rises up again and walks to a short distance, in the time of which it mostly voids fœces. Its skin is hot and dry, with a scaliness, and its pulse and breathing quick. It eats very little, and does not chew the cud, but appears to have an unquenchable thirst. Frequently rumbling is heard in its bowels, which is followed by the passage of fœces, that are thinner than common, having little or no resemblance to the hard purl of healthy sheep. As the disease advances, the purging increases, the discharge becomes thinner, and mixed with blood, then slime and blood, and at last it is black and fœtid, being evidently attended with severe griping and straining. The discharge is frequently green, after a wet summer, the grass seeming to pass with little change of colour. In the mean time, the sheep rapidly wastes away, being reduced in a day or two to a perfect shadow, with its belly tucked up to its back; it separates from the rest of the flock, wanders unsteadily about, and hides itself among the fern, heath, or any thing that will cover it. Its eyes are suffused with red, its breathing becomes more laborious, an unpleasant smell exhales from every part of its body,

its fœces are absolutely putrid, it is quite overpowered by the disease, and it continues straining and purging until death closes the scene.

In these cases, the carcase, immediately after death, has a peculiarly unpleasant smell, and is mostly distended with air. The body being opened, the fat of the omentum appears to be wasted away, or to have acquired a reddish colour, and there is a general redness diffused over the whole contents of the belly. The mesentric veins are remarkably swelled. The stomach and bowels are filled with fetid air, but contain no fœces, except a little slimy matter. The intestines, especially towards the anus, are often livid, thickened, and ulcerated, on their internal surface. The muscles soon become green and do not lose their unpleasant flavour, even when salted. The subcutaneous and muscular fat is less wasted than might have been supposed.

The appearances which distinguish this state or form of the disease from that of the common looseness, diarrhœa, or scour, are, that the latter chiefly attacks hogs, weak gimmer, and two-shear sheep, while the former is common among the older ones; that the one almost always takes place in the spring, and ceases in the middle of summer, when the other only begins; that in that there is no fever, tenesmus, or pain, before the stools, as in this; that in that the fœces are loose, but otherwise natural, without any blood or slime, whereas in this they consist of hard lumps passed occasionally, the rest being blood and slime; that in that there is not that degree of fœtor in the fœces, which takes place in this; that in that the appetite is rather sharper than usual, in many cases, while in this it is wholly gone; that that is not contagious, while this is highly so; that in that only a temporary stop is put to the thriving of the sheep, it afterwards making rapid advances to strength, vigour and proportion, while in this it wastes rapidly; that that is rarely fatal, unless the sheep has been before greatly debilitated, while this is commonly so; and that the state noticed below, is distinguished from the blood or sickness, by the season of the year in which it shews itself, and by this disease, in its usual form of a bloody flux, affecting other individuals in the same flock, at the same period of time.

It is supposed by some, that if a sheep survive this disease a few days, or a fortnight, it mostly recovers, In this case, there is either very little or no blood in the fœces, the slime dries up, and is mixed with hardened balls; the feverish heat abates, the skin becomes moist, the vigour of the eye returns, the appetite increases, and the wool rises slowly, assuming its natural appearance, but a great part of it often comes off. It, however, grows again, and sheep which have had this disease commonly become very healthy and sound, being rarely attacked by any other complaint.

In some cases, the flux never breaks out at all, but the feverish state and other appearances are the same. This form of the disease has received the name of *dumb braxy*, and is neither so fatal nor so epidemical as the other, although when they recover, the wool drops off in the same manner as in the other cases.

MEANS OF PREVENTION AND CURE IN SIMPLE LOOSENESSES OR SCOURS.

In the prevention and cure of the disease, in the first case, or that of simple looseness or scour, the former is to be attempted by the removal of the sheep to less rich pastures, where it depends on the state of the herbage, a little dry food, as hay, bran, or any other such

substances, being given them once in the day for a little while; or, in such cases, the sheep should only be admitted to the rich pastures for a certain portion of the day, being put into a fold or pen during the night, having some dry hay to eat; or they may be turned into an up-hill pasture, as this would prevent the great loss, which often takes place from this cause. As soon as the sheep are gradually inured to such pasture food, the hay or other dry matters, and the above precautions, are unnecessary. All kinds of dry, hard, strong, grass-pastures, are very useful in preventing sheep from being attacked with this complaint.

In respect to the means of cure, where the disease continues more than a few days, and is still increasing, so as to endanger the life of the sheep, other modes, such as those below, are requisite to be employed, In some slight cases, where the looseness arises from cold, it may be speedily cured by putting the sheep in a house for a few days, and letting them feed on dry hay; and where it depends on damp and wet grass, or the wetness of the spring season, a little dry hay, given in the fold at night, has often a great effect in checking and curing the disease. In such cases, sweet milk is likewise often used as a means of cure, which, by its constipating, nourishing, and invigorating qualities, is greatly beneficial. Many sorts of simple astringent matters might also be employed with good effects.

Where, however, the disease proceeds from weakness, irritation, and a relaxed state of the bowels, it is mostly beneficial to clear them at first, by the solution of an ounce or more of sulphate of soda, or a similar quantity of common salt in boiling water, and giving it immediately; after which, substances of the astringent and strengthening kinds may be had recourse to, with a view of stopping the discharges, and wholly removing the disorder.

Take of—Prepared chalk, in powder, two drachms,
Shavings of hartshorn, dried and powdered, one drachm and a half,
Cinnamon bark and rhubarb root, in powder, of each half a scruple,
Hard opium, in fresh powder, one or two grains; mix and make them into a powder, which may be given once or twice a day, in a little gruel, with a spoonful of some sort of spirit in it: or the decoction given below may be more convenient and useful in some cases:

Take of—Calcined hartshorn, in powder, one ounce and a half,
Shavings of the same, half an ounce,
Linseed, bruised, three ounces,
Common chalk, powdered, one ounce,
Cassia, in coarse powder, two drachms; boil them in three pints of water to two, then strain off the liquid, and add,
Tincture of catechu, two or three drachms; make a decoction: a small wine-glassful of which may be given twice in the day, where the disease is violent, with from thirty to sixty drops of the tincture of opium in each.

These forms will remove most moderate cases of the disease in a short time; but where there are critical discharges of this kind depending on a laxity of the intestines, which are greatly weakening the habits of the sheep, the following form will be necessary:

Take of—Logwood shavings, four ounces,
Jepan earth, in coarse powder, one ounce and a half; boil them in water, two pints to one, then strain off the fluid, and add to it
Compound tincture of cinnamon, two drachms; make a decoction; of which half a gill may be given in the morning and evening, with from twenty to fifty drops of the tincture of opium in each, where the bowels are much disordered, or the disease has long continued.

The *black* purging or scour which sometimes takes place, and which is mostly the effect of some former disease, proceeds, as in some other cases, from some abrasion or mortification having happened in the bowels, and part of their coats being discharged, in mixture with blood and an acrid thick bile. It is a

case which is always fatal; the sheep should, of course, be killed, on its first appearance, in order to preserve the carcass, which would otherwise be lost and of no value. It is equally fatal when proceeding from other causes, as in hot weather from a redundancy of bile.

IN WHITE AND GREEN SKITS OR SCOURS.

In the second and third cases, or white and green scours, the prevention and cure may be effected by the sheep, when feeding on such waste parts of rich fouled roots, having some good dry food, as hay, finely-cut straw, bran, or some substance of the same kind, given along with them to prevent their effects on the stomach and bowels; and by the use of such remedies as these:

Take of—Bay salt, finely powdered, four ounces; dissolve it in good old
Verjuice, one pint,
Tincture of opium, two drachms,
Compound tincture of cinnamon, half an ounce,
Common spirit, half a pint; mix them well, and give three or four large spoonfuls every day or two, having the diseased sheep separated from the rest of the flock.

In such cases, when slight, the use of a strong infusion or decoction of willow and cascorilla bark may be found very beneficial when given in the quantity of a glassful or two, with fifteen or twenty drops of the tincture of opium in each dose.

IN YELLOW SCOUR.

In the fourth, or cure of yellow scour in lambs, little is commonly done either in the way of prevention or cure; though many might be saved by the use of small doses of the decoction of the shavings or other parts of hartshorn in milk, given once or oftener in the day, the lambs being prevented from sucking so freely.

Where, in these cases, the looseness depends upon too much acid being formed in the stomach, the following formula may be useful:

Take of—Subcarbonate of potass, in powder, one drachm,
Chalk, in powder, two drachms,
Bark of cinnamon and root of rhubarb, in powder, of each eight or ten grains; mix them into a powder, and give it in a little warm gruel once or oftener in the day, ten or twelve drops of the tincture of opium being added to it when the purging continues obstinate.

In some cases, two or three table spoonfuls of the decoction that has been directed in the first case of scour, with the same quantity of the tincture of opium which has been stated above, given once or twice in the day, will be still more serviceable in removing the disease.

IN THE GRASS SCOUR.

In this case, or that of grass ill, the lambs should be kept as much as possible from the eating of grass, and at the same time have their stomachs strengthened and improved by giving them a decoction of common chalk shavings of hartshorn and cascarilla bark in the quantity of a small tea-cupful every day in mixture with a little milk. It has been supposed, too, that common salt might be beneficial in these cases.

IN THE DYSENTRIC SCOUR.

In the last case, or dysentric scour, the prevention and cure are attempted by such means as these: with a view to the former, the sheep are dispersed as equally over the ground as possible, so that it may not become foul or tainted in any part by their crowding in any one place, and that the sheep may feed more easily and freely; by choosing the most airy dry benty pastures and places for them, by keeping them clean and free from smell, and by so dividing them in the folds, that they may not get a heat, by being too throng, which is apt to cause them to *nist* or break out in a flux,

which taints the ground. Every other sort of change is likewise made which has a tendency to keep them clean and well aired.

On the appearance of the disease, those infected are speedily removed to some distance from the other sheep; a free use is made of tar to the sheep in common, by way of arresting the contagion, and by salving them where the disease still continues, which mostly stops the disorder; though they sometimes keep dying off until the frost sets in, and then it ceases, after much loss.

The business of the cure is to be begun, by giving small doses of rhubarb, in powder, as half a drachm, until it operate, or about four grains of ipecacuanha, in powder, every two hours, until they open the bowels freely; after which, mucilaginous substances are to be used freely, by way of sheathing the alimentary canal. Flour, or other meals, well boiled in sweet milk, may be employed in this design with great benefit. Then different astringent substances may be had recourse to in combination, by way of lessening the inordinate action of the bowels, and checking the too great determination to them, such as the following:

Take of—Japan earth, in coarse powder, one ounce,
Extract of logwood, two drachms,
Prepared chalk, one ounce and a half; boil them in a pint and a half of
Water to one pint, and then strain off the liquor through an open cloth, giving about a gill of it twice a day, with from twenty to thirty drops of the tincture of opium in each dose, and two drachms of the compound tincture of cinnamon.

In some cases, the form given below may be more suitable, as where there is great weakness with frequent discharges from the bowels:

Take of—Oak bark, in coarse powder, four ounces,
Gum kino, in powder, three drachms,
Common chalk, powdered, two ounces; boil them in
Water, three pints; when cold, strain off the liquid, and add of
Compound tincture of cinnamon, half an ounce,
Tincture of opium, one drachm and a half; make them into a mixture, from half a gill to a gill of which may be given twice a day in a little gruel.

The use of opium alone, either in the solid or liquid state, may often be highly beneficial; the former in the quantity of a grain or two, and the latter in that of fifteen or twenty drops or more.

Some advise it as highly beneficial, in cold weather, where the sheep are in high condition, to bleed them, by cutting the tail across, as well as to stove or heat them, so as to bring on perspiration, which is more easily done after bleeding; care being taken not to expose them again too suddenly to the ordinary temperature of the atmosphere, lest a relapse be caused by the cold of it.

In some of these ways this frequently fatal disease may often be managed with great safety and success.

OBSTRUCTIONS CAUSED BY PINDING IN LAMBS.

This is a state which is wholly confined to sucking lambs. It is the most frequent and dangerous when the ewes are in high condition and the pastures dry, rich, and good. It is caused by the excrement of the lambs, which, before they begin to eat grass, is of a tough adhesive nature, some part of which often sticks to the tail and buttocks, and when become hardened by the heat of the sun, and the air, in some cases glues and fastens them together so closely, and in such a manner, that there is no possibility of any passage or evacuation being had, in consequence of which the intestines soon swell, mortify, and burst.

This state, or disease, is easily and readily discovered, by the lamb appearing uneasy, swelled, and sick, with the upper and middle

part of the tail closely and firmly fixed and glued down in the above manner.

The cure is easily accomplished, by separating the tail from the buttocks in a careful manner, by first softening the parts in some way, as by soft soap and warm water, in bad cases, when the retained excrement is soon discharged, having a very offensive smell; the immediate recurrence of which is to be guarded against and prevented, by rubbing the parts over with some ointment or dry powdery matter, or friable mould or mud: the lambs should, however, be looked after for eight or ten days, until such time as they begin to eat grass, when all danger from this sort of obstruction is over. The change of pastures, as to those of the more poor, sound, heathy kinds, may also be greatly useful in some cases, and where any thing is internally necessary, a little pounded chalk and ginger, with some aromatic seeds, may be the most beneficial.

WATER SICKNESS, OR DROPSY.

This is a complaint which takes place in sheep, either as depending upon some other disease, or as a disease itself. It is incident to them on all the different kinds of soil, and in every climate, from the most northern parts of the island to the most southern. In common, aged sheep are the most liable to its attacks, and it chiefly takes place on farms that are greatly destitute of shelter, towards the end of the harvest season and in winter. It is, indeed, the genuine offspring of cold, moisture, and all such causes as tend to weaken and debilitate the body in a high degree.

The appearances which denote its taking place are swelling in the legs towards night, which disappears in the morning, when the lower jaw becomes a good deal swelled. The eye is dull, the urine, when noticed, is high-coloured, the tongue is dry, and, as the disease advances, the belly becomes enlarged and tense, water being felt undulating in it, on its being struck with one hand, while the other is kept steady on the other side. The sheep loses its strength, spirits, and disposition to feed; becomes lean and thin, and ultimately falls a sacrifice to the disorder.

In the prevention and cure of the disease, such means as the following are to be pursued. With a view to the former, dry sheltered walks and pastures, and sea-shores are found to be useful. And where the disease appears with great severity in the winter and spring, when the seasons are very wet, shelter in the night-time is of material importance in stopping the increasing mischief.

In the cure of the sheep which are diseased, they should be housed, and have a supply of good dry hay given them; with which, such remedies as are directed below may be found useful:

Take of—Subcarbonate of potass, in powder, half a drachm,
Dried squill root, in powder, six grains,
Cinnamon bark, in powder, half a drachm; mix them into a powder, which may be given once or twice in the day in a little gruel.

A powder of this kind, given twice a day, has often very great effect:

Take of—Supertartrate of potass, or
Cream of tartar, in powder, two drachms,
Root of jalap, in powder ten grains,
Ginger root, in powder, a drachm and a half; mix them, and give the powder as above.

A ball, formed in the following manner, is likewise very useful in many cases:

Take of—Submuriate of mercury, or
Calomel and root of squill, in powder, of each, five grains,
Root of jalap, in powder, ten grains,
Ginger, in powder, one drachm and a half,
Honey, as much as is necessary to make them into a ball, which may be given at night in a little thick gruel.

In any of these ways, as soon as the water is removed, strengthening remedies must be fully employed where necessary.

Taking away the water by tapping, has been practised, but with a mere temporary advantage.

The killing of the sheep is advised by some graziers, as soon as the disease appears, as they get daily into worse condition.

AFFECTIONS OF THE LIVER, YELLOWS, OR JAUNDICE.

This is by no means a common disease among sheep, but it occasionally takes place, especially in the more fine and tender breeds of them. The causes which produce it are not very evident, but their effect appears, in general, to be to harden the liver, and invariably to obstruct or impede the passage of the bile from it into the intestines. This is sometimes produced by small stones found in the gall bladder; while at other times, as in the case of rot, it is caused by the swelling of the glands, impeding the passage of the bile, which latter is mostly incurable. Some sort of impediment to the bile, therefore, seems to be the immediate cause of the disease; as when that fluid is prevented passing into the canal of the intestines, the digestion of the food, and separation of the chyle from it, is not properly carried on; and the bile is made to take a new course, and to contaminate the whole body.

The appearances which distinguish the disease are, a yellowness over the whole body, which is particularly remarkable in the white of the eye. The wool also has a little of the tinge, and is slightly hard. The passages of the belly are of a whitish colour, and the urine tinges of a yellow hue any thing which is immersed in it. There is sometimes, likewise, a degree of fulness and hardness on the right side, where the liver is placed. In some cases, the sheep pine for some days and are very sick. In these diseases the entrails, on dissection after death, are of a dark yellow, and have a particular smell. These cases are peculiar to old sheep. In other instances, where old sheep are affected with this disease in particular seasons and situations, as about harvest, on mossy lands, the whole body puts on a yellow hue, and even the tallow is of the same colour, when the body is opened after death. The distemper, in this case, is soon at a crisis, from the time of its giving the yellow hue, being commonly fatal in twenty-four hours, or less. It is a state of the disease, however, which is not common in sheep.

The cure in the *yellows*, or jaundice, is to be attempted by such remedies as act strongly on the stomach, by those which attenuate and open obstructions in the affected parts, and by the more active purgative substances of the saline kinds. Strong solutions of common salt in water, with a drachm or two of the compound tincture of cinnamon, answer well in some cases. Eight or ten grains of ipecacuanha, in powder, made into a ball with a drachm of powdered ginger and syrup, will prove highly beneficial, when given two or three times a day in a little warm strong beer, and continued for some days; a full dose of the sulphate of soda being given after it, to clear the bowels, as a solution of two or three ounces of it in boiling water.

Where these means do not succeed, the forms directed below may be tried, which often prove very effectual in removing the disease:

Take of—Tartrate of potass, in powder, two drachms,
Root of rhubarb, in powder, ten grains,
Turmeric, in powder, a drachm and a half; mix them into a powder, which may be given once a day in a little gruel.

But a more effectual composition for the

purpose, in some cases, is prepared in this manner:

Take of—Castile soap, one drachm,
Subcarbonate of potass, half a drachm,
Turmeric, in powder, two scruples and a half,
Powdered liquorice root, one drachm,
Sulphurated oil, as much as is necessary; beat them into a mass so as to form a ball, which may be given once a day as the above.

The submuriate of mercury or calomel, with sulphur, in the quantities of two or three grains of the former, and about half a drachm of the latter, may often be given with benefit in a little warm milk, once or oftener in the day. And the nitrate of potass, or common nitre, is sometimes recommended, in small doses, as useful in these cases.

ROT, OR WATERY POKE.

This is a disease which frequently attacks sheep in particular moist situations, and wet seasons, and which is often very destructive and fatal in its nature.

It is common in moist soft pastures, where the grass is of a fine, unsubstantial, tathy quality, and where the animals have suffered greatly, and have been much reduced by the severity of the preceding winter season. Some persons have been led to suppose, that the disease is of several different kinds; but others are of opinion, that all the different appearances in the body of the sheep, are but different states of the same disease, all proceeding from the same cause. In what is termed the *black rot*, however, which proceeds from improper feeding, the sheep often dies apparently fat; while in that which is called *hunger rot*, which is caused by a real deficiency of every sort of food, it is constantly in a complete state of waste; and that the animals in the former are irrecoverably lost, while in the latter they not unfrequently recover in some measure, and apparently become tolerable, though never good sheep.

The causes which tend to the production or prevalence of the disease, may be said to be such as depend on the nature of the soil, that of the weather, and that of the animal itself.

Such pastures as are the most soft and rapid in the growth of their grasses, are in general the most productive of the disease; as sheep are constantly safe while they have a good, firm, medium keep, and are not liable to fall away from a state of full condition to that of leanness.

The disease prevails the most in wet seasons, especially when the weather proves soft and mild towards the latter end of autumn, and when there is a great spring of fine tender vegetables of the grass kind.

Where sheep have a natural tendency to become weak, or are liable to become debilitated by any slight causes, they are rendered more subject to be affected with the disease than in other cases.

There may be another cause of the disease in immediate-fed grass lands, after watering, especially, when done in the summer; as in this way the ova of the liver-fluke, *fasciola hepatica*, may probably be conveyed upon the grass, and be afterwards taken into the stomach of the sheep with it; which can hardly be bred in any other manner, than by such ova being carried into the situations where the flukes are found, either by the circulation, or some other more convenient channel; for such grasses may not only prepare a nidus for the fluke, by rendering the liver of the sheep diseased, but convey the ova of the insect itself into the body of the sheep.

It is not well or exactly ascertained, in how short a space of time a sheep may be infected

with the disease in feeding on a pasture which produces it; but in some cases it takes place very speedily, and in others at no great distance of time, as in a night, or the course of a few days, though in some cases it is a much longer time in taking effect.

The seasons in which sheep are most liable to be attacked with this disease, are those of the autumn and early spring, when the weather is soft and mild; but as soon as frost sets in the danger is mostly over.

As in the early stages of this disease, sheep which are attacked with it mostly fatten as quickly as those which are in a healthy state, it is of great consequence, in many cases, to have the means of distinguishing them as soon as they are affected with it. This may generally be ascertained by the following appearances, which clearly point out the disease to be present. In warm, sultry, and rainy seasons, when sheep, pasturing on low moist lands, fatten rapidly, and some die suddenly, there is cause to apprehend that they have taken the disease; which is further confirmed, when in a short time afterwards they shrink and become loose and flaccid in their loins. At this time, by pressure about the hips, a crackling is occasionally perceived; the countenance also begins to look pale; and, on the fleece being parted, the skin is found to have exchanged its vermilion cast for a pale red; and the wool is readily separated from the pelt or skin.

In proportion as the disease advances, the skin becomes dappled with yellow or black spots. The eyes now begin to lose their lustre, and become white and pearly, on account of the red vessels of some parts of them and their lids becoming much reduced in size, or wholly destroyed. To which appearances succeed debility and wasting of the body, which continue to increase until the sheep die, unless, perhaps, before the fatal termination, local or general dropsy comes on. These symptoms are rendered more severe by an obstinate purging, which comes on at no certain period of the disease. In the progress of the complaint, the sheep become what is called *chockered*, or affected with a pokey swelling under the chin or throat, which is caused by a fluid collected in the cellular substance of that part.

In the course of five or six days after being attacked with the disease, the thin edge of the small lobe of the liver becomes of a transparent white, or bluish colour, which spreads along the upper or lower sides of the same, in proportion as the complaint is more or less severe; in some cases not extending more than an inch from the outside. The whole of the peritoneal coat investing the liver is diseased, in severe cases, when that organ generally assumes a dull colour, interspersed with dark red lines, or a sort of patches. The upper part of the same is, in some instances, speckled like the body of a toad, to which it is supposed to have a striking resemblance; all about the common duct of the liver and hepatic vessels, a jelly-like matter is deposited, which varies in quantity in proportion to the severity of the attack, from a table-spoonful or less, to five or six times that quantity. On boiling, the liver loses its firmness, and separates into small pieces in the water, or remains in a soft and flaccid state. It has been observed, that sheep are much disposed to fatten in the first few weeks after being affected with this disease.

After the first stage of the disease, flukes begin to appear in the biliary pores, the common duct of the liver and the gall-bladder, which at first are small in quantity; but as the disease proceeds, they multiply, and are often

very numerous, before the fatal termination of the disease. In the latter states of the disorder, they are occasionally found in the stomach, as well as in the intestines and liver.

On opening a sheep which is destroyed by this disease, soon after its death, little smell is emitted. When the skin is taken off, which is unusually tender, the fell, as it is termed, is entirely white, and the whole carcass has a dull, white, or leaden colour. Water is sometimes found in the belly. The liver, and especially its concave side, is always enlarged, sometimes to a very uncommon size, and instead of its healthy red colour, is of a livid dun, variegated with many white spots. These agree with the indurated portions of its substance, which are the more readily and easily felt, as the other parts are soft and spongy; or an appearance takes place, as if the liver was interlarded with layers of sand. Equally on the outside of the liver, and in its ducts, are generally found great numbers of an ugly flat insect, of the fluke or flounder form. These are not, however, peculiar to this disease, as they are found, though very few in number, and very small in size, in the greater part of aged sheep, and in some rotten sheep they do not exist at all. In cases where the liver is very rotten, it is likewise studded with hydatids, or globules of water, which are also found adhering to the lungs, and among the tallow. Besides these appearances, the liver does not stiffen when boiled, and it becomes very quickly putrid. The small intestines are of a blackish colour, and tender, as if they were rotten, scarcely bearing to be handled, and the lacteal glands are always swelled and hard. The lungs are greatly swelled, especially in the early state of the disease, assuming a whiter colour than usual, and they are often marked with white streaks on the outside, under which are to be found hard, cartilaginous, or bone-like substances.

The mutton of sheep affected with this disease does not stiffen, but continues flaccid when cold, dissolving nearly away on being boiled, and having a weak, watery, insipid taste; and the muscular fibres are pale and wasted. The fat seems to continue, but it appears dry, of a dead white colour, and is brittle or shining with water, being wholly altered in its nature, not melting or inflaming like fatty substances in general, but, when thrown on the fire, crackling, and blackening to a cinder. There is very little blood found in the sheep, and that which there is, is pale and thin, like water tinged with blood rather than blood itself. The bones are remarkably brittle.

In the natural terminations of this disease, which differ in proportion to the nature and the state of it, various other appearances are left in the sheep. In cases where the inflammatory action quickly disappears, without destroying or injuring the state or texture of the parts, little mischief is done. But if the vessels of a part be thrown into inflammatory action only for a few days, effusion usually takes place, and the coats of them become thicker, and put on a buffy colour, which often lays the foundation of considerable future mischief; as sheep that recover from this disease shew very different marks after death, according to the various degrees of severity of the attack; but the taint is seldom, if ever, wholly removed.

In cases where sheep die suddenly in the early state of the disease, an effusion of serous fluid may mostly be discovered in the cavity of the belly, and then the peritoneal coat surrounding the liver is commonly coated over with coagulable lymph; which is a form or state of the disease that has been improperly confounded with another disease of sheep,

which affects the internal parts, that of red water.

Where collections of matter are formed in the liver, they are seldom so large as to destroy the sheep immediately; but in consequence of the absorption of matter which they afford, they frequently waste away and die from other disorders. When such collections are small, sheep will often recover sufficiently to have lambs for three or four seasons, and after that become tolerable mutton.

When lumps or knots are formed in the liver, the whole substance of it has been seen so full of small, roundish, hard bodies, that it was difficult to find any sound part in it; the disease having deceitfully so far advanced before it evidently displayed itself, by the wasting and loss of flesh in the sheep.

The cure of this disease is probably not to be wholly accomplished by any means which are yet known; as the inflammatory active state, which it is supposed lays the foundation of the affection, is mostly over before the complaint is certainly known to be present; and in attempting to alleviate or to remove the effects which are left by it on the body and constitution of the sheep, there is little that can be done. Different remedies have been resorted to for this purpose, as solutions of common salt in water, which are found to be safe and effectual in many cases of the slighter kind. But in those which are more severe and obstinate in their nature, greater benefit may often be derived from such means as these:

Take of—Oxide of antimony, in powder, half a pound,
Cinchona bark, in rough powder, three ounces; infuse them in
Ale, one quart, for six or eight days; when give the sheep a small tea-cupful of the clear liquor once or twice a day.

In the other cases, the effects are said to have been remedied by the use of the following composition:

Take of—Turpentine spirit, four ounces,
Rain water, eight ounces,
Compound tincture of cinnamon, one ounce; mix them, and give the sheep two or three table-spoonfuls after fasting all night; when, at the end of three or four days, the sheep being kept during that time on dry food, it may be repeated in the same manner, with the same sort of keep, for three days more; when it may be allowed to return to the pasture.

In cases where there is a dropsical tendency, great advantage has been gained, in retarding the progress of the disease, by remedies of the kind directed below:

Take of—Foxglove leaves and flowers, a small handful; infuse them in a quart of hot water for twenty-four hours, then pour off the clear liquid, and add to it,
Compound tincture of cinnamon, one ounce,
Tincture of squills one ounce and a half; make an infusion, and give the sheep a table-spoonful, or more, once or twice a day in half a pint of treacle and water: or the following powder:

Take of—Root of squill, in powder, five grains,
Submuriate of mercury, two grains,
Rhubarb root, in powder, ten grains,
Ginger, in powder, a drachm; mix them into a powder, which is to be given once a day in a little thick gruel and treacle.

But a more general remedy in these cases of disease may be prepared in the manner below:

Take of—Common salt, four ounces,
Tartarized soda, in powder, half an ounce; dissolve them in
Boiling water, one quart,
Turpentine spirit, three ounces; rub it with
Mucilage, until perfectly incorporated; then add slowly the
Solution of the above ingredients,
Nitrous æther, one ounce and a half,
Dilute sulphuric acid, from two drachms to half an ounce; mix and make them into a solution, two, three, or four table-spoonfuls of which should be given to each infected sheep in the morning, after fasting all night, the sheep being prevented from feeding for some time afterwards, repeating the dose every two or three days for several times.

Where salt-marshes or dry lime-stone soils can be used as pastures for the sheep, they tend greatly to assist in the cure of the disease, as well as to preserve them sound and in health.

It is probable, indeed, that a free use of lime-water might contribute, in a very great degree, to the cure of this very destructive disease in many instances.

The prevention of the disease, which is of most consequence, as it cannot be perfectly cured, must materially depend on the use of dry sound pastures; the giving of suitable dry food, as cut chaff and hay, with salt, in wet seasons, and the providing of better drainage, shelter, and protection for the sheep in wet situations and such seasons.

EXTERNAL SORES ON THE HEAD.

It is not uncommon for such sheep as are pastured in woody and other close situations to be affected in this way. It mostly arises in consequence of their being greatly teazed about the head by flies, which induces them, in order to drive them away, frequently to scratch or beat that part with their hind feet, so as to cause a sort of wound or sore; which, when neglected or improperly managed, becomes of a dangerous nature. Such sores occasionally spread much, assume a very unpleasant appearance, and become extremely troublesome and hurtful to the sheep.

Many different applications have been in use for their removal or cure; but such as have the effect of keeping off the flies, as the bituminous and other oily kinds, are not favourable to the healing of such sores; consequently, a plaster covering, which sticks fast on the surrounding parts, and wholly excludes the flies, is of most utility, and frequently becomes necessary. This plaster may be prepared by liquefying over a very slow fire until they are wholly incorporated, such substances as these: half a pound of tar-pitch, with three ounces of liquid tar, and two ounces of sublimed sulphur, adding about two drachms each of resin and lead plaster, or diachylon, and forming them into a plaster; which, when just warm, may be spread rather thickly upon pieces of linen cloth, or soft leather, shaped to the heads of the sheep, and applied evenly over them on the surrounding sound parts. There will be less danger of their being rubbed off or disturbed, when they are applied in the evening, as they become well set on the parts by the cold of the night, and the sheep are also more quiet during that time.

When the plaster is melted and properly cool, some store-masters prefer applying it over the whole, or spreading it on the sore parts, by some convenient means, and directly setting or coating the whole over with a little short wool; but the first is the neatest and best practice, as not heating the sheep so much, and permitting the healing of the sores in the most favourable manner.

In very hot seasons, care is to be taken that the plasters have a sufficient degree of adhesion, as they are apt to become loose, if rendered too liquid by the substance which is spread upon them.

Where there is wool sufficient on the surrounding parts of the head, the best method may probably be, to sew on the cloth all round the parts.

The same mode of dressing such external sores is sometimes applicable, where the horns of rams are knocked or forced off in any way.

In all such cases, the hind legs of the sheep should be carefully hoppled by some soft substance, to prevent their scratching the parts, and forcing off the plasters or cloths

EFFECTS OF THE BITES AND STINGS OF VENOMOUS ANIMALS ON THE HEAD.

These are injuries that are accidentally caused by means of some sort of hurtful animals of the creeping or lurking kind, as they most generally occur in such places as are known to abound with these sorts of reptiles. There are a great many reptiles and small animals that may be hurtful in this manner, such as the snake, slow-worm, adder, asp, and several others. This effect may be produced by the unsuspecting sheep grazing too near the places where such reptiles are concealed; which being thus alarmed, instantly dart at the sheep, and by biting, stinging, or in some other way, according to the nature of the animals, communicate their poisonous malignity about the heads of their disturbers.

The appearances of the disease are, that the head almost instantly swells, the tongue and gullet become inflamed, and sometimes ultimately turn black; the extraordinary nature of the swelling soon impedes the breathing; and probably, in this condition, the sheep lives a day or two in great agony, when it dies. The whole body, in some cases, is swelled, and there is in general a great swelling and falling down of the ears.

In the cure of these affections, early bleeding, by cutting off the ears and tails, as well as opening the veins under the eyes of the sheep, are greatly beneficial. Vinegar or hartshorn spirit may be freely given internally, as well as applied all over the swelled parts, which should be kept constantly wet with such applications; which are very efficacious in such complaints. Vegetable tarry substances have probably but little if any effect in such cases.

AFFECTIONS OF THE EYES, OPHTHALMIA, AND WHITE FILM, OR BLINDNESS.

These are inflammatory states, which affect different parts of the eyes, as the borders of the lids and coats of the eyes themselves. The former is caused by a local inflammation acting on the edges of the lids, being induced by too much exposure to cold and moisture, and the too great action of reflected light or heat in particular cases and states of the parts. The latter is a case which often causes much loss by accidents, being brought on by an inflammatory state of some part of the eye itself, which is excited by the reflection of heat in very sunny dry weather from the ground, and too much light at that and other times; and by various other irritating causes, acting on the weakened state of the parts, and upon the whole body, from too great disturbance and exposure to damps, and severe states of the air. A white film is produced, which grows over the eyes, and occasions total blindness. Whole flocks are sometimes affected with it, and it often comes on towards the latter end of the year, chiefly seizing such sheep as are in the best condition.

These different states often take place after washing and clipping the sheep in the latter end of the summer season, and is the cause of much shrinking and loss of flesh in them.

The appearances which distinguish the first of these diseases are, that the eye-lids become inflamed, red, and sore, throwing out a sort of ropy or slimy mucus, that often glues or fastens them together, There is much wateriness in the eye, with an impatience of light, and the sheep creeps into dark shady situations.

In the latter, the appearances are these: the sheep cannot bear the light, the white part of the eye is red and inflamed, and the eye waters a great deal; these affections are succeeded by the formation of a membrane by the inflamed vessels, which first covers or spreads

over the white, but, by degrees, extends over the whole eye, until total blindness takes place. This is evident, when in folding, the sheep run against fences, or other obstructions, and start when they approach them; they do not follow the flock, and they frequently stumble. On inspecting the eye, it is commonly found, that a blue slough covers the whole of it, without any intermixture of red vessels. The coloured and transparent parts of the eye, in very bad cases, become of a reddish white, by which time the film of the eye has acquired much thickness. In cases where the white film settles over the eyes, and grows thicker, and when the eyes appear perfectly white, the disease is much longer in being removed.

In the cure of the former of these states, where there is much inflammation, and the disease has only just begun, but seems likely to increase, local bleeding from the part may sometimes be useful and necessary, and then the following remedies may be employed:

Take of—Submuriate of mercury, two or three grains,
Tartarized soda, in powder, one drachm,
Root of jalap, in powder, ten grains; mix them into a powder: which may be given once every day or two, for three or four times, in a little treacle and thin gruel.

The eye-lids may then be well washed, or made wet, with applications of the kind directed below, once or oftener in the day:

Take of—Sulphate of zinc, seven grains; dissolve them in
Rose-water, eight ounces; make them into a wash: or,

Take of—Diluted solution of subacetate of lead, one drachm and a half,
Spirit of camphor, one drachm,
Tincture of opium, ten drops,
Rain water, one pint; make a wash.

In the latter disease, the inflammation is at first to be got the better of, by bleeding from the part, as much as may be necessary, and by purging with calomel, or a solution of the sulphate of soda, for a few times. The shading and washing the eye once or twice a day with a solution of half a drachm of superacetate or sugar of lead, in a pint of soft water, or, which is better, in some cases, by the following:

Take of—Alum, one drachm,
Sulphate of zinc, one scruple; dissolve them in
Soft water, one pint,
Tincture of opium, twenty drops; make a wash.

As soon as the inflammatory state is removed, if the slough or film continue, it should be attempted to be destroyed by the use of the soft liniment, or powder, directed below:

Take of—Nitric oxide of mercury, or
Red precipitate, one drachm; rub it fine with oil; then add,
Calamine cerate, one ounce; make them into a soft ointment; a little of which should be inserted into the eye once a day, by means of a soft feather: or,

Take of—Glass or crystal, finely powdered, two drachms,
Loaf sugar, one drachm and a half,
Prepared calamine, one drachm; make a powder; a little of which may be blown or dropped into the eye once or twice a day.

Prepared verdigris, rubbed very fine with oil, and applied by drawing a perfectly soft feather over the eye, may be equally serviceable in many cases.

The sheep, in these cases, should be always well guarded against waters, pits, and other causes that may be destructive to them. The blindness of sheep not unfrequently disappears in a short time, without any thing being done to them.

ITCHY ERUPTIONS ON THE SKIN, OR SCAB.

This is an infectious disease which often attacks sheep, and which, from one diseased sheep, will speedily communicate itself to the rest of the flock; being seldom removed without much trouble and difficulty, in the prepa-

ration of the whole flock, which renders it necessary to be extremely cautious in the introduction of strange sheep among others. The disease is of the scabby cutaneous kind, which probably never takes place without infection being present, though it may be promoted by bad keep, dirt, and other such causes. It is common in the spring, and at some other times, and the young, white-faced, fine-woolled sheep, are the most subject to it. The disease is supposed to be the worst, when it assumes the dry scabby state.

It is shown to be present, by the infected sheep becoming restless, and, instead of feeding quietly, attempting to scratch themselves with their hinder feet, tearing off the wool, and nibbling the skin with their teeth; by their frequently rubbing themselves against stones, posts, banks, rails, and other places convenient for the purpose. When closely examined, the skin has a red fretted aspect, and sends forth a peculiar, thin, sharp humour, which hardens into a sort of scabby scaly crusts, which fall off, and are succeeded by others which are still larger. These may be felt by the finger when only as large as half a pea, and generally extend from between the shoulders along the back. The wool contracts a dirty brownish appearance, with white spots in it; it falls off prematurely, and the sheep ceases to grow, wastes in flesh, becomes thin, and, if not relieved, sinks at last under the continual irritation and debility occasioned by the disease. The rubbing-places are liable to be impregnated with the infectious matter of the disease, and, of course, to be dangerous instruments in the production of the disease.

In the cure of this disease, sublimed sulphur may be given two or three times to the sheep, in the quantity of a large tea-spoonful, in mixture with treacle and milk.

It has been usual to make use of strong liquid preparations of the tobacco-water kind, and solutions of sublimate in it, as external applications, in curing the disease, and they perfectly effect the purpose; but they are now found to be much less favourable to the growth of the wool, and the health of the sheep, from their harsh, dry, and acrid qualities, than remedies of the ointment kind, which have not only a superiority in the removal of the complaint, but likewise in forwarding the peeling off of the scabs.

TOBACCO WATER.

When the mixture of tobacco water and oil of turpentine is made use of, it is prepared in this manner:

Take of—Shag tobacco, half a pound,

Water, two quarts; simmer them together until the latter be reduced to three pints; then press out the water, and add,

Oil of turpentine, three ounces; mix them well together, and put them into a bottle, well corked, for use. This liquor is applied by bathing or washing the parts well with it, after scratching off the tops of the scabs by the finger, or in some other manner.

This is a remedy which puts the sheep to very little inconvenience, which is capable of being used safely at all seasons, and which readily cures the disease.

OINTMENTS.

The ointments, which are chiefly in use for this purpose, are those of the sulphur and mercurial kinds. The former may be prepared, by mixing five ounces of sublimed sulphur with one pound of hogs' lard, rubbing them well together. This is very effectual in the less severe cases of the disease, being mostly sufficient for five or six sheep.

The compound sulphur ointment would probably have a superiority in some bad cases.

The latter, which is preferable in many cases may be composed in the following manner:

Take of—Purified mercury, or

Quicksilver, three ounces; rub it in a mortar with one drachm of

Muriatic acid, one ounce and a half of

Venice turpentine, and two ounces of

Oil of turpentine being slowly added, until the whole of the globules of it become extinct, and it is perfectly incorporated with them; then add,

Hogs' lard, one pound, blending it intimately with the other ingredients, and making an ointment.

This ointment is rendered much more readily prepared, and intimately united in its parts, upon which its convenience and goodness materially depends, by the use of the small quantity of the muriatic acid. Sufficient caution should always be taken in applying this sort of ointment, especially in the cases of ewes, which have lambs, as otherwise they may be greatly injured or destroyed by its effects. The best mode is, to lay it thinly and evenly in the sheds, which are to be made in proper directions in all the parts which are infected, though a greater number of dressings should be required in using it in this way.

In the application, the wool on the back of the sheep being separated in a shed, down to the skin, all along from between the ears to the tail, a part of the necessary quantity of ointment is laid on and rubbed in through the whole. Then the wool is divided in sheds, in one or two lines, on each side, and the rest of the ointment laid on and well rubbed in, which finishes the business. It is, however, thought necessary, in many cases, to have sheds formed in the wool down the shoulders, as well as on the thighs, and other parts which may be infected with the disease, and the ointment laid on and rubbed in on them as before mentioned.

The above quantity of ointment may be sufficient to dress, in the winter time, seven or eight highly-diseased middling-sized sheep, and, when slightly affected, two or three more. But, in the spring or summer time, half the quantity may probably be sufficient, as much less is required in hot than cold seasons. With some store-masters, it is the custom to dress the whole of their sheep, whether diseased or not, every year, as a means of clearing them of filth, and promoting their health and thriving, for which purpose a less quantity still is sufficient; or a weaker ointment may be employed, and be only applied to particular parts.

When the ointment is to be used in a hot season, it should have more body, by adding a little wax or resin to it, as a due consistence is useful, as well in respect to its spreading as in restraining it from running to waste.

The most proper time for dressing sheep in this way, is in a dry period, at the beginning of autumn, though it is sometimes necessary to do it when the spring has advanced a little, and the sheep have got some strength. It is considered, by some store-masters, to be an unsafe practice in the winter season, and the cold months which approach it, though in most cases it cures the disease in one dressing.

It would probably be useful, in lessening the quantity of ointment necessary, and in rendering the cure more expeditious, to have the scabby scurfy parts, in bad cases of the kind, well washed by soft soap and water; and the tops of them rubbed off before the application of the ointment, which should not take place until after the sheep have become dry.

The expense of dressing sheep by these methods, is from about two-pence to three-pence, four-pence, or more, where the cases are bad.

RED, SCABBY, WATERY BLISTERS, IN THE SKIN.

This is a disease which commonly takes place in the winter season, but which is seldom met with in some places. It is caused by the skin being fretted by exposure to cold and wetness,

which forces blisters to rise, in consequence of the body being brought into a feverish state, by which they are thrown out. The blood, in such cases, is but little affected, though some little of it gets into the blisters on the skin, and gives them that peculiar reddish tinge which distinguishes them.

It usually begins by first affecting the parts about the breast and belly, though at times it spreads itself over the other parts of the body. It consists in an inflammation of the skin, which raises it into blisters, containing a thin, reddish, watery liquid, which continue for a short time, then break and discharge their contents, being succeeded by a blackish scab.

In the cure of the disease, in bad cases, where there is much inflammation, a little blood may be taken away. The sheep is best when put in a proper fold or place by itself, where the blisters can be slit up, and some warm water or infusion of tobacco be poured into them; giving, at the same time, the powder directed below:

Take of—Sublimed sulphur, two ounces,
Nitrate of potass, in powder, half an ounce; mix them into a powder, a sixth part of which may be given once in the day in a little warm gruel.

If necessary, the bowels may be opened by solution of the sulphate of soda.

The affected parts should then be washed with a little lime-water and spirits of wine, in the proportion of eight parts of the former to one or two of the latter.

By this treatment the disease is generally cured in a short space of time.

ERYSIPELATOUS INFLAMMATION OF THE SKIN, OR WILD-FIRE.

This is a disease of the skin, which, if not well and speedily attended to, is apt to spread rapidly among the flocks. It usually begins to shew itself towards the beginning of the autumn, but does not continue more than eight or ten days at a time, yet such sheep as are once attacked with it, are liable to a return of it.

There is a considerable creeping inflammation and small spreading eruption on the surface of the skin, which is often confined to some particular part; but blisters are rarely met with on the body.

In the cure of the complaint, the inflammatory stage may be removed by the use of a solution of the sulphate of soda, in the quantity of an ounce, once a day for two or three times; or the following powder may be better in some cases:

Take of—Submuriate of mercury, three or four grains,
Nitrate of potass, in powder, one drachm,
Root of jalap, in powder, ten grains; mix them into a powder; which may be given in a little thick gruel and treacle once a day for two or three times.

Local applications of the diluted solution of subacetate of lead may be used at the same time.

When the inflammatory state is over, bark may be thrown in, if the sheep be worth it, as there is a rapid tendency to debility.

SCABBY SORES ON THE TAIL, OR TAG.

These are situated on the under side of the tail, and arise in warm weather, in consequence of its being fouled with purging. The matter thus applied hardens there, irritates the tender vessels and skin, and produces sores, which, if not speedily attended to, run into mortification, and become fatal.

It is known to be present, by the sheep turning frequently round to bite the tail; by their scratching it with their hind feet; and by their great uneasiness or restlessness.

In the cure of the disease, as it is chiefly

caused by the frequent, dried, adhering excrementitious discharge, such discharge should be first restrained and removed, by the means directed under the head *Scour*. After which the wool should be clipped away from the tail, and the sore on it should be laid bare, and be well and carefully washed, first with milk and water a little warm, and then with lime-water. The sheep, after this operation, are to be turned out into a dry pasture, being looked at again, in respect to the sores, in two days, when, if not well, the washing must be repeated, and the parts that are sore should be anointed with a composition of tar and tallow-grease, in equal proportions, well mixed together. This practice being repeated once or twice, is mostly sufficient for completely effecting the cure; but, in case the disease continue, the washing and anointing the sores are to be performed more frequently, and the strength of the ointment may be increased by the addition of more tar, and a little cerussa in fine powder.

VERMIN AFFECTING THE SKIN, SHEEP LICE, AND TICKS.

These kinds of vermin are the pests of all sorts of sheep, and especially such as are in a weak, unthrifty, and impoverished state of body. The louse, or ked *hippobosca ovina*, which is a small active animal, of a brownish colour, and flat make, with three legs on each side of the head, is very troublesome to all sorts of sheep, and particularly to such as are in a lean condition, and of the young kind, as hog-sheep. It harbours in the wool, bites the sheep, and sucks their blood, and is very prejudicial to their health and thriving.

The tick, *acarus reduvius*, which is a distinct sort, that has nearly the same make and colour, but is of a considerably larger size. It is greatly hurtful to sheep, by preventing them from thriving, and by causing them to tear off their wool, by rubbing against fences and other bodies, as well as to displace it in other ways, to the great injury of the skin and coat. It always adheres closely to the bare spots of the shoulders, thighs, or ears, drawing away the blood from them. It is extremely harrassing to lambs and young sheep in the spring; but generally drops off towards the middle of summer.

For the destruction or removal of these mischievous vermin, different external applications are used, such as tobacco-juice, or tobacco-water, mercurial ointment, and solutions of arsenic.

Tobacco-juice or tobacco-water almost instantaneously destroys the first of the above sorts of vermin, and the latter is generally removed by it.

Mercurial ointment effectually destroys both sorts, and is considered, by some store-masters, to be the most efficacious, as well as the most favourable to the sheep and wool. Less than a pound of it, as already directed, will be quite as much as is necessary for dressing ten or twelve lambs, and when properly applied will destroy all such vermin. Cold weather is, however, to be avoided, in the application of all such dressings with this substance.

When solutions are employed, those composed of soft soap, pearlashes, and arsenic, are probably the best; the first in the proportion of about two pounds, the second in that of a quarter of a pound, and the last in that of one pound, finely powdered, to twenty-five or thirty gallons of boiling water. When cold, this solution may be made use of for dipping or washing the lambs or sheep, by putting them in a tub, and keeping their heads well above the liquor. As soon as they have been well soaked in the liquid, they should be removed to another tub, the liquor should be

well squeezed out of the wool, by the hands, and returned to that in the other tub for further use. In this way many sheep may be washed in a short space of time.

These remedies are sufficiently powerful for removing all such sorts of vermin from the bodies of sheep.

EFFECTS ON THE SKIN BY THE FLY AND MAGGOT.

In hot, sultry, summer weather, sheep are constantly pestered with flies, especially in woody situations; which sometimes force them into hedge bottoms and ditches, where they escape from them, but by which means their coats are often much injured, and they are prevented from improving in condition. In some cases, the sheep are stricken by the fly, which deposits its ova in a proper situation on the skin, causing much mischief by the production of the maggot.

In order to prevent this evil from taking place, different substances in the form of powders, are made use of in different places, such as those below:

Take of—White arsenic, in fine powder, four ounces,
Sublimed sulphur, and
Cerussa, or white lead, finely powdered, of each three ounces,
White precipitate mercury, in fine powder, half an ounce; mix them into a powder for use.

This, if divided into fifteen parts, will dust so many sheep, and render the application of it exact. In using it, the sheep being held by the head, a person with a finely perforated sort of small tin box, containing the necessary quantity of the powder, dusts with one hand, while the other draws a small stick slowly along the wool, from the head to the tail, closely after it, which forcing the wool down, the powder is better applied and more thoroughly mixed in its rising again. The whole is then evenly sprinkled over, by some convenient means, with a little water, drawing the same stick backwards and forwards several times, which causes the powder to stick to the wool, and to produce a better effect.

Where an objection is made to the use of arsenic in such cases, another powder, for the same purpose, may be composed in this way:

Take of—Sublimed sulphur, four ounces,
Cerussa or white lead, in fine powder three ounces,
White precipitated mercury, powdered, six drachms,
Root of white hellebore, in fine powder, four ounces; mix them into a powder: which may be used as the above, but in a little larger quantity.

This is nearly if not quite as effectual as the other, in preventing sheep being stricken with the fly. The powder of unslaked lime is also considered useful in this way.

The maggot becomes troublesome among sheep, when the weather is warm, towards the latter end of summer. It is the produce of the flesh or sheep-fly, *æstrus ovis*, caused by its ova being hatched among the filth of the skin, or in sores of it, where they are soon brought forth, the maggots eating and penetrating, in every direction under the skin, inducing great pain, and even destroying the sheep, if not removed in time.

When maggots begin to form in any part of the body, the wool on it becomes in a moist or wet state; the sheep hold their heads down, shake their tails, and run about from place to place. Therefore, when they are seen to be uneasy and harassed, to frequent rubbing places, to neglect their food, to lie down frequently, and to bite themselves, they should be examined carefully; when large blisters will often be found, under which the maggots are concealed; or the part is become of a dark colour, and quite wet; or large holes are already eaten into the body of the sheep.

In these cases, the wool is to be carefully clipped off, the blisters, if present, opened, and the maggots picked out by the points of the shears from the diseased parts; which are then to be gently washed, and dusted with suitable applications, as those of soft soap and water, spirits and vinegar, lime-water, soap and stale urine, or infusion of tobacco, and dusted with white lead, or lead with tar in mixture with some greasy substance.

But a solution of the following kind is deemed preferable in some cases:

Take of—Oxymuriate of mercury, or,
Sublimate, in powder, half an ounce,
Muriatic acid, or,
Spirit of sea salt, one ounce,
Oil of turpentine, one pint,
Boiling water, three pints; dissolve the sublimate in the water, and, when it is cold, add the other ingredients, shaking them well together.

This solution should be kept for use in a bottle prepared with a small pipe through the cork, by which means any small quantity may be applied when necessary.

GLANDULAR, INFLAMMATORY, AND OTHER HARD SWELLINGS IN THE UDDER.

These are common affections among some sorts of sheep, as ewes at the time of lambing, and in other cases. The former having often a flush of milk at such periods, that over-distends the udder, irritates it, and brings on inflammation; and the latter are frequently troubled with hard knotty enlargements in the parts from local weakness and obstruction.

On examination, if the udders of the ewes be found to pass the milk freely, there is little danger of mischief; but when they are greatly enlarged and inflamed, so as to have the milk obstructed in its passage, danger may be apprehended. In all such cases, the inflammation and swelling should be attempted to be removed by such applications as the following:

Take of—Soft soap, one ounce and a half; rub it with the
Solution of subacetate of lead half a drachm; then slowly add,
Oil of turpentine, and,
Spirit of camphor, of each, two ounces and a half,
Solution of subcarbonate of ammonia, two ounces; mix them into a soft liniment; a little of which may be rubbed over all the swelled parts once or twice a day, as soon as the milk has been drawn.

The practice of opening the passages for the milk through the teats with small, stiff, wiry probes, or other such instruments, on the supposition of their being glued, or fastened up, is always to be avoided as much as possible, as it is attended with much danger.

In case suppuration takes place in such swellings, it will be necessary to open them and discharge the matter, dressing the wounds in the usual manner.

SORE UDDERS AND NIPPLES.

These not unfrequently take place in ewes, in consequence of the skin becoming fretted and rubbed off, by which they become so extremely sore and tender, that the sheep is greatly harassed and distressed, being prevented from feeding in a proper manner. The sides of the udders, and the tips of the nipples, are chiefly affected in this way. In attempting the cure of this disease, the parts should first be well washed with soft soap and water, and then have a little of the following liniment rubbed over them:

Take of—Cerussa, or white lead, in powder, one drachm,
Cerate calamine, one ounce and a half; rub them with
Olive oil, as much as is necessary to form a soft liniment.

BLISTERING, INFLAMMATORY, ULCERATING SWELLING, IN THE LEGS, OR LEG EVIL.

This is a disease which mostly comes on towards the latter end of the summer, and occasionally in the beginning of the autumn.

It is more common in some places than others, as in the lower parts of the north of the country, arising usually among the better breeds of sheep, though other sorts are equally subject to it. It is originally caused by the exposure of unhealthy bad-constitutioned sheep to wetness in rainy and warm weather. In sheep, in this state of body, scratches in the legs will produce it. The legs being dirtied in the house, where there is much dung, in the time of clipping or smearing, will readily bring on the affection ; and miry land, on the same account, has a tendency to produce it.

The appearances are as follow: The disease mostly begins at the knee, which swells to a large size, causing such a degree of lameness, as to prevent the sheep affected from following the flock. Sometimes, however, it commences at the head of the hoof. It is of a bluish or livid cast; having not unfrequently small blisters scattered over the affected leg, which have a red colour, and are filled with a bluish-coloured watery fluid. These, when the skin of them bursts, leave below it a loose flabby substance, of the same colour, or rather darker, which extends itself even to the bone. This, in common, begins first in one of the hind legs, but, as it proceeds, affects the four, unless death closes the scene before this takes place. It sometimes spreads from the hind legs to the belly, and in every case the kidneys are affected, being loose and flabby, in some measure resembling the swelling of the legs, and having sometimes a livid colour. In some cases the disease proves very quickly fatal, while in others it remains for weeks in a more mild state. When once it appears in a flock, it spreads very rapidly, and if not attended to, does material injury. In common, it is very dangerous, taking off the greater proportion of those affected with it. The affected sheep are indeed often killed as soon as the disease is discovered, in order to prevent it from spreading. The eye of the sheep, in this disease, is languid, its tongue dry, its pulse weak and quick, it cannot eat, and, in most cases, it is soon destroyed.

In the cure of the disease, as it is very dangerous, the sheep affected with it should be brought home as speedily as possible, in order to prevent the further infection of the flock; when it may have from half a drachm to a drachm of bark given it in a little warm milk, once or twice a day for some days; the legs being well washed with soft soap and water; they should be then bathed with lime-water, or a solution of alum in water; after which, they may be anointed with the mercurial preparation, known by the name of citrine ointment. Or, in case this remedy be not at hand, when the legs break out, and run, a little quick-lime powder may be dusted over the sloughs, and the affected parts should be covered over with a cloth spread with a mixture of spermaceti ointment, and a little liquid tar. These dressings should be changed every two days ; and care should be taken that the sheep have a good dry pasture and water at the time; and, in such cases, water, that has had peat earth steeped in it, is considered most useful, on account of its astringent or antiseptic quality, both as drink and for washing the legs with.

It is of much consequence, in preventing the disease, to keep the legs of the sheep quite clean and free from dirt, by clipping away the wool and thoroughly washing them. From the nature of the complaint, it has sometimes the name of *Black Leg*, but it is attended with less fever than takes place in that disease in cattle, though it is equally quick and fatal in its progress and termination; as great weakness and mortification, or a tendency to it, often soon

display themselves. Change of pasture is sometimes useful in such cases.

STIFF AND RIGID AFFECTIONS OF THE LEGS, OR CRAMP.

This is a disease which affects sheep that are pastured in woody situations, where there is much wetness from the trees.

It most commonly occurs in cold and wet seasons; and is caused by the droppings from the trees. In some instances it spreads at once through the whole flock.

It seizes the legs of sheep, and makes them wholly incapable of walking. In these cases, the action of the nerves and muscles of the legs, appears to be so much impaired by the cold, that their power is lost.

In the cure, rubbing the affected parts well with warm flannel, and keeping the sheep dry, will be found of great use. A tea-spoonful of bruised mustard-seed may be given internally, night and morning, in a little warm gruel; and a small quantity of oil of turpentine, rubbed externally over the parts, has great effect. By these means the cure will, in most cases, be easily accomplished. But where it is obstinate, a little of the following embrocation may be occasionally applied:

Take of—Essence of mustard, half an ounce,
Spirit of camphor, two ounces,
Tincture of opium, two drachms; mix and make them into an embrocation, to be used as above.

RHEUMATIC AFFECTIONS, OR STIFF JOINTS.

It is common for some of the lambs in flocks to become seized with a stiffness in the joints about the middle of the summer season. The disease is caused by the change of temperature, and the poverty or low state of the ewes, which does not afford them sufficient support, as at that time they are usually disposed to grow very fast.

In consequence of the want of due nourishment, they get stunted in their growth, their joints swell out, and become painful and stiff, but they in general recover.

When any thing is necessary to be done in the nature of cure, the lambs may have the following powder given to them once a day, for two or three days, in a little treacle and milk, the ewes being changed to a better pasture.

Take of—Submuriate of mercury, one or two grains,
Guaiacum gum-resin, in powder, ten grains,
Root of rhubarb, in powder, five grains; mix them into a powder, to be given as above.

ULCERATING SORES IN THE FEET, WHITLOW, FOOT HALT, OR ROT.

These are a sort of ulcerations which frequently take place in the feet of sheep, especially those of the larger kinds, where the pastures are long grassed, soft, and dirty. They most commonly appear towards the latter end of the summer, but are often met with at other times. Some store-masters consider them as infectious, by tainting the grass, where, by coming in contact with the feet of the sound sheep, the disease is produced. Long grass and wet weather, by softening the feet of the sheep, when continued for some time, tend to bring on these festering sores, which cause much lameness, and, if not attended to, may rot or corrode off their hoofs, and be their destruction. Some store-masters, also, distinguish the disease by dividing it into two stages or states, the first comprehending the former of these denominations, and the latter the last. Much loss is frequently sustained in consequence of these affections, and the improper modes of treating them, in different cases.

The disease is first discovered by the sheep halting, or walking lame. It has the resem

blance of whitlow, and it most commonly affects the two fore feet, but sometimes all the feet. The outer part of the hoof is the usual seat of the disease, and from the cleft, a sharp fetid humour exudes, sometimes producing maggots, and corroding the flesh, and even the bones, in some cases. There is an inflammation around the hoof, which often turns black, and the hoof sometimes drops off. It is an extremely painful disease, so that the sheep frequently walks on its knees; as the weather grows cold, the disease generally abates, though the sheep still continues lame.

For the cure of these festering sores, there are several different modes and applications in use; but in all of them, the lame sheep should be brought up and put into some dry yard or place a short time, until the feet become quite dry: they should then be carefully brushed and examined, the diseased hoofs should be pared, and if there be any dirty or festery appearance, under them, they should be laid open, in order to discharge the acrid matter that may be present, and then they should be wiped quite clean and dry.

In slighter cases, the tender parts should be well bathed with such a mild caustic solution as this:

Take of—Sulphate of iron, or green vitriol, one ounce,
Vinegar, five ounces; make them into a solution; or, if necessary to be stronger,

Take of—Sulphate of copper, or verdigris, in powder, one ounce; dissolve it in
Sulphuric acid, one ounce and a half, and make a solution.

And if required of still greater strength,

Take of—Nitric oxyd of mercury, six drachms; dissolve it in
Nitric acid, one ounce and a half; then slowly add,
Proof spirit, two ounces; and make a solution.

Any one of these solutions may be used as the nature of the cases may require.

The sheep should be kept with clean and dry feet during the night, in some suitable place, and the diseased parts of them be bathed again in the morning; some time after which, when the moisture is off the grass, they may be turned alone into a dry bare pasture, and if of the lime-stone kind so much the better.

Though they will seldom require any more dressing, they should be examined in the course of two or three days afterwards, and the feet, which may be in want of it, be again bathed, and should it be found that the dirt or fester has extended farther than was before supposed, the hollow parts of the hoofs are to be pared off, and the sore places bathed with the solution. The sheep, under this practice, get daily more sound, and are soon in a state to return to the flock.

Some store-masters, after a few dressings in this manner, and when the parts begin to have a more favourable and healing aspect, have recourse to mild dressings of the compound tincture of the benzoin kind, and such other substances as may protect the feet from the wet.

When the hollow parts of the hoofs have been done away, washing the ulcerated parts with the mixture, directed below, is considered an excellent remedy:

Take of—Diluted sulphuric acid, or
Spirit of vitriol, one ounce, by measure,
Oil of turpentine, four ounces,
Verjuice, one pint; make them into a mixture for use.

In the use of any of the stronger caustic substances, such as the muriate or butter of antimony, which is more effectual in bad cases, than the above, there is more caution and exactness required. It is usually applied over the parts prepared as above, by means of a feather or wooden skewer, and once dressing

is commonly sufficient. The sheep are treated, and turned out, in the manner above described.

Either of these caustic liquids, sulphuric or nitric acid, are considered to be nearly equal to the butter of antimony, for this purpose, when laid all over the ulcerated parts; the feet of the sheep having previously been prepared by brushing all the dirt from between the claws, by means of a very small sort of tooth-brush. The sheep should stand dry for some time afterwards, as mentioned above.

Where such strong liquid caustic substances as these are employed, there is seldom occasion for a second dressing, unless proud or spongy flesh arises, in which cases it will be necessary to repeat the dressing two or three times, at the distance of a few days.

In cases where the ulcerations are not removed by means of these applications, but continue and increase, with large masses of spongy flesh arising between the claws, the best practice is, to remove the latter by the knife, and dress the part with lint and pledgets of tow, having first well sprinkled a little of the following powder over the part, and then binding it up with a long piece of tape:

Take of—Sulphate of copper, in powder, one ounce,
Dried alum, in powder, six drachms,
Superacetate of lead, in powder, half an ounce,
Nitric oxyd of mercury, rubbed fine, two drachms; mix and make them into a fine powder.

By these means the bleeding is restrained, and the proud flesh kept down; the cure being usually completed by a few dressings.

This powder may be used in the form of a paste, by the addition of a little honey, and be applied in the way of a plaster, or it may be rubbed well over the parts.

In all such cases, the effectual dressing the feet of the sheep should be had recourse to as immediately as possible, otherwise much loss will inevitably be sustained.

The standing on caustic lime in the house for a short time has lately been deemed to be an effectual cure for these affections of the feet of sheep; but the only probability of its success is, when the disease is first making its appearance, as when it is inveterately established, such a remedy can have but little effect.

EXTERNAL ACCIDENTS, WOUNDS, BITES OF DOGS, AND STABS, OR CLIPS IN SHEARING.

Sheep are not liable to have wounds, except from such causes as the above, when they are often very troublesome and hurtful to them, from being so much exposed to flies, and from several other circumstances.

In fresh accidents of this sort, nothing further is scarcely ever necessary than to clean them well, and keep them from the too great action of the air; by keeping the parts of them as closely in union as possible, by which means they speedily heal.

But where they are of long standing, and have a bad appearance, such mixtures as the following may be useful:

Take of—Compound tincture of benzoin, three ounces,
Oil of turpentine, two ounces,
Spirit of wine, one ounce; mix them, and put them into a bottle for use.

A little of this mixture, after being well shaken, should be applied to such wounds once a day, until they put on a better aspect, which will soon be the case, and the healing process will regularly proceed.

In cases of stabs with the shears in clipping, the use of a little of this mixture may occasionally be beneficial, in preventing the succeeding inflammation and its consequences,

and is much better than tar, which is the usual application in such cases.

The clips are probably best dressed with a composition of well-boiled tar, bees'-wax, and a very little common diachylon, so as to render it firm on the wounds, as tar, which is commonly used, is too liquid and too soon displaced.

ITCHING FROM NOSE WORMS.

The noses of sheep, as well as of goats, stags, and some other animals, are subject to wounds produced from the ova or eggs of a large two-winged fly. The frontal sinuses above the nose in the sheep are the places where these worms lodge, live, and attain their full growth. These sinuses are always fully supplied with a soft white matter, which furnishes these worms with a proper nidus and, support, and they are sufficiently large for their habitation. When they have here acquired their destined growth, and are fit to undergo their change for the fly state, they leave their old habitation, and falling to the earth, bury themselves until they are transformed into flies. The female fly, when she has been impregnated by the male, resorts to the nose of a sheep, or other animal, as the place in which to deposit her ova, or eggs, where they are brought to maturity. Mr. Valisnieri, to whom the world owes so many discoveries in the insect class, was the first person who has given any true account of the origin of these worms; but though the true history had been, till that time, unknown, the creatures themselves were very easily discovered, and many ages since were esteemed as remedies in epilepsies.

The fly, produced from this worm, has all its lifetime a very great disposition to inactivity, and does not like to make any use of either its legs or wings. Its head and corslet together are about as long as its body, which is composed of five rings, streaked on the back; a pale yellow and brown are there disposed in irregular spots; the belly is of the same colour, but they are there more regularly disposed, for the brown here makes three lines, one in the middle, and one at each side, and all the intermediate spaces are yellow: the wings are nearly of the same length with the body, and are a little inclined in their position, so as to lie upon the body; they do not, however, cover it, for a naked space is left between them: the ailerons, or petty wings, which are found under each of the wings, are of a whitish colour, and perfectly cover the balancers, so that they are not to be seen without lifting these up. The fly will live two months after being produced, but will, it is said, take no nourishment of any kind.

These worms no doubt produce that occasional itching which is so often seen to take place in the noses of sheep, but it has never been deemed necessary to remove them; and, if removed, their places, no doubt, would be soon supplied. They cannot be so injurious as those worms which prey upon the intestines or internal parts; but they may sometimes be hurtful, and therefore it may be necessary to remove them; which may be best done probably by rubbing a little strong mercurial ointment, for two or three times, upon the places where they are lodged.

MEAGRIMS.

This is a disease which has been supposed to proceed from breeding repeatedly from the same kind or family of sheep, or in the same line. When sheep are attacked with this disease, the first appearances are, cocking of the tail, and running in a sort of canter about the pasture, when, if the hand be put upon the

back, they will immediately sink down, which seems to shew that the disorder is seated in the back part of such sheep. When sheep have been once infected in this manner, it is dangerous to continue the breeding from such stock, as great losses have occasionally been sustained by such means. It is, therefore, advisable, as soon as it is perceived that the distemper has gained ground, to change the sort of sheep, as no means have hitherto been discovered for either its prevention or cure. As though a single sheep in a flock may sometimes be affected, and none besides, yet it has not unfrequently happened, that several have been taken with the disease at the same time, and under the same circumstances.

The disease termed the *Rickets* has much similarity to this, and is equally incurable; consequently, it is only to be remedied by a proper change in the stock; as otherwise the disease is apt to run through the whole flock.

CUTTING OR CASTRATING MALE LAMBS.

This is an operation which, in most cases, is probably the best and most properly performed, while the lambs are quite young, as already seen; but as it is not unfrequently executed at a later period, and when they have had a more considerable growth, the manner of effecting it in that state may be here described.

When the lamb has been secured, the usual method is, to cut off a sufficiently large portion of the end of the scrotum, cod, or bag, so as to let the testes come readily out in such a manner, that they may be easily held fast. They are then taken away by searing the small parts by which they are attached with a cauterizing iron, made sufficiently hot for the purpose; with which also the parts are then perfectly touched all over, so as to prevent any bleeding; and a little elder, or green ointment, is rubbed over the parts, which completes the process. As the whole of the cauterized parts must suppurate and slough away; it would seem that the use of the ointment is wholly unnecessary, since the healing process takes place better without it. The lambs, after being kept up a short time, should be turned out into a dry piece of pasture ground.

The only danger to be feared in these cases is, that of too much inflammation taking place in the parts, which, upon the first appearance, is to be instantly guarded against and prevented, by the application of a suitable embrocation of the spirit kind, such as that prescribed below, which should be used in a small quantity, as there may be occasion:

Take of—Oil of turpentine, three ounces,
Proof spirit, one ounce,
Tincture of myrrh, six drachms,
——— opium, half an ounce; mix them for use.

The most proper weather for performing this operation is, when there is a state of mildness and dryness, with an inclination to coldness in the atmosphere, as there is then the least danger to be apprehended from an inflammatory state of the parts; whereas, when there is much moisture or dampness in the air, such effects are far more apt to occur.

The symptoms of such an inflammatory state are, the great stiffness and inactivity of the animal, on moving itself, and its remaining much in the lying posture; for when it moves freely about, or is only a little stiff, no apprehension need to be suspected of its being in such a state.

TWITCHING OLD RAMS.

This is an operation which is sometimes necessary to be performed, and which is executed

in the following manner: A piece of strong folded thread, or a small cord, is passed round the bottom part of the scrotum or cod, between it and the body of the ram, but not so near it as to take hold of the skin of it, and cause inflammation; nor so far down as that the testes may be taken hold of, and be so injured as to occasion great pain and danger. If the cod or bag be tied in the exactly suitable part, so that the vascular stringy portion by which the testes are attached, may be perfectly confined without hurting either, the sensibility will be so much lessened, that the animal will scarcely feel any uneasiness, and there will be little or no danger of its being lost by the operation. The cord to be used in such cases should be formed of thread, of a sufficient substance and strength to bear being pulled quite tight, and should be well waxed with some sort of material suitable for that purpose. This cord is then to be drawn so tightly, that no circulation whatever can take place between the parts above and below. It is necessary before the ligature is passed round the parts, that the cord itself, as well as the part round which it is put, should be well rubbed with a small portion of some sort of grease, and that the former be made a little wet with the oil of turpentine. An improper practice is sometimes resorted to after the cord has been passed round the parts, namely, to take off the whole of the cod below, at the distance of about an inch and a half from the cord or ligature; in consequence of which, it not unfrequently happens, (especially where the circulation in the parts is not wholly stopped, and an entire deadness produced,) that inflammation and gangrene take place, so as to cause the sheep to die in the course of a few days. It is proper to observe, that the sort of knot to be used in these cases, is one which will draw quite tight, and not slip or give way in a backward direction.

When the parts have been made properly tight by the cord, and the circulation is wholly prevented between the parts, the inferior portion will soon drop off; but it is frequently useful to take off a small part of the end of the cod, so as to let out the testes, which commonly come away before the skinny part of the cod is ready to drop off, and separate from the other part.

Section XV.—*Different Uses to which the several parts of the Sheep are appropriated.*

Sheep are animals of the utmost importance to mankind, whether considered in the light of affording food and clothing, or in that of the vast improvement and profit, which they produce in the various systems of management to which they are subjected by the breeder and farmer; in some instances, constituting a very large proportion, and in others, nearly the whole of their dependence and support. There is, also, another point of view in which they appear to be in some places equally advantageous and interesting, which is that of their becoming, by their

DUNG AND URINE,

beneficial in situations and upon lands that must otherwise be nearly, if not wholly, useless. We have already shown that the manure, afforded by sheep-dung, by means of proper folding in yards, properly littered with straw, stubble, &c., may, in many cases, be increased to a considerable extent, so as to render it an object with the sheep-master and farmer.

Sheeps' dung and deers' dung are nearly of

the same quality; and are generally esteemed the best of all dungs, except that of the horse, for cold clayey lands. Some recommend beating them into powder, and spreading them, in that way, very thin, over autumnal or spring crops, about four or five bushels to an acre, in the same manner as ashes, malt-dust, and some other such substances, are strewed: but this light dressing does not last long. The most common way of conveying the former upon the land is, by folding of the sheep, in some places, themselves upon it, by which means their urine is saved, as well as their dung, which ought to be turned in with plough, as soon as possible, that it may not lie exposed to the heat of the sun. In some districts of this country they think it best to fold sheep after July, and to fold them the latest upon dry land. In some parts of France, where they likewise fold their oxen and cows, the place of folding is changed twice every night. In Flanders they house their sheep at night, in places spread with clean sand, about five or six inches thick, which is cleared out once a week. This mixture of sand and dung, when in sufficient quantity, makes an excellent dressing for strong land; for the dung and urine of the sheep, when fully fed, is a very rich manure. M. Quintinie thinks them the greatest promotors of fruitfulness in all sorts of ground. This method of folding sheep in a covered fold, and of mixing their dung with earth, sand, &c. according to the nature of the soil to which it is intended to be applied, is likewise strongly recommended by some old writers, who declare that they have known vast crops of rye upon barren lands, that have been old warrens, well dunged by rabbits; and large oak and ash trees upon the same, though the soil was very shallow, and of the worst kind.

The nature and uses of the urine have been noticed and considered, in speaking of that of neat cattle, where it will be found to be a very excellent material for the purpose of manure, in many situations, when properly mixed and prepared for application.

Add to which, that

SHEEP'S TROTTERS,

A refuse material procured from the fellmongers, serve also as manure. They are bought at about sixpence the bushel, loosely heaped, in some places, and cost about twopence more in carriage, being used in the proportion of about twenty to forty bushels the acre, being afterwards pricked in, to prevent their being eaten by dogs, crows, &c. They answer best on such lands as are rather dry, and when the season is moist.

SKIN, OR PELT,

Of which ladies' shoes, gloves, &c. are made. The skins of these animals differ much in thickness, size, and other properties, according to the nature of the different breeds. Sheep pelts or skins, sometimes form an article of great utility and profit to sheep breeders and farmers, being sold to the fellmongers, or other persons in the neighbourhood, under constant contracts by the year, at different prices; as from the time of shearing to the beginning of the autumn, at from 1*s.* to 1*s.* 6*d*; from that until towards the beginning of the spring, at from 2*s.* to 2*s.* 6*d.*; and from that period to shearing time again, at from 3*s.* to 3*s.* 6*d.* Something of this method is pursued by the South Down sheep-farmers in the sale of their sheep-skins, as well as by those of several other great sheep districts, by which great advantage often arises.

Other parts of these animals afford a variety of useful and important articles, such as parch-

ment, leather, glue, suet, &c., which are of great value, for different intentions and purposes in the arts, and other ways, and which employ a great number of labourers in forming and preparing them. In short, there is hardly a part of the sheep that does not afford a valuable product of some sort or other; and, for utility, it may, of course, be placed next to the cow.

Besides the uses that have been just noticed, these skins are formed into white leather, shammy, basils, and rones. The skins or pelts of sheep are valuable in proportion to their sizes, the largest being the most so, which, when properly dressed and prepared, are worth from five to six shillings; while the smaller inferior sorts, when prepared and made up in the best manner, are scarcely of half the value.

DIVIDING OR SPLITING SHEEP SKINS.

This is a somewhat new invention, and performed in a beneficial and successful manner at the manufactory of Messrs Bevington and Cos., Bermondsey, by a patent apparatus or contrivanc, which is wrought by means of steam. To this use and intention every sort of skin is not equally well caculated; but those of the large kinds of sheep, as the true Lincolnshire, are the best of any, as being less close and compact in the two layers or *lamina*, into which the skins of this sort are formed; most of the fine woolled smaller breeds of such animals having their pelts formed in too close and united a manner for the purpose, not being capable of bearing the operation or process. This is in consequence of there being too little of the greasy intersticial matter deposited between the different *lamina* of which they are constituted. In the finer woolled sort of sheep, there is scarcely any seeming distinction of these two lairy portions of which such skins are composed from the smallness and fineness of the oily or greasy interposing material; while, in some large long woolled sorts, as the Devonshire or Berkshire, the quantity of such interposing wool forming and fabricating matter is so large and abundant, that the different layers of the skins became quite clear and evident; and very great quantities of the grease is procured in the process, which is useful wherever a coarse greasy material is wanted. There are, of course, several advantages resulting from the invention, the trouble and necessity for much weighty pressure to render the skins close and firm in the whole, and in their different parts is avoided, much useful greasy substance provided, and much larger proportions of better leather produced, as that formerly produced, from its less close state and imperfectness of manufacture, was liable to decompose and decay much sooner, especially when exposed in particular circumstances and situations, and to be applied to less important purposes. The different parts have in the present method, thinner and finer forms of the two portions, the application of the one is linings for hats, caps, and other such articles; and the other for being made into various substances of much utility in the arts, being in much request and value. Where the skins have much thinness even in the long woolled large breeds and intermixtures, they are equally as improper for the purpose of spliting as the small close pelted kinds, as they cannot undergo the process at all, still retaining a portion of the greasy substance, that cannot be got quite off by any means yet known. The fatty or greasy intersticial matter which rests between the two natural layers of skin of which such pelts are constituted, unquestionably supply the means of the nutrition and growth of the wool in all sorts of sheep, but as the large thick skinned sheep, that answer this

use the best, are not remarkable for the quantity of yolk which they throw up; it may be probable that such fatty matter may have something of the nature and quality, of the *rete mucosum*, as found in other cases, in it, as well as that of the simple greasy property, which may serve the purpose of giving flexibility and elasticity to the skinny coverings of the animals, as well as promote the increase in the growth and goodness of their woolly coats. This is rendered still more probable, as those small fine woolled breeds and sorts of sheep, which have the most supply of yolk, as the Merino, the South Down, and the Norfolk, are the closest and most compact, and united in the nature of their skins, and the least fit for the process or operation of splitting. Whether the large and weighty fleeces of the heavy and great-sized Lincoln sheep can be raised without a much greater thickness in their skins than other breeds or kinds, so as to be perfectly fit for the comb and for sustaining the various preparatory operations before being manufactured, is a point or matter which has not probably been yet so attended to or investigated as to be fully decided; but very thick pelts can never be a property in sheep that ought to recommend them either for the purposes of breeding or feeding, however the thinness of skins may be objected to, as producing but little wool and not standing the severities of bad weather. It is not unfrequent for sheep with no great or extraordinary thickness of the skins, to afford full and weighty fleeces, and become considerably fat in the carcass at the same time.

It is supposed by many, that the advantage of sheep skins in this country is a matter of little consequence, but when the annual number of them is taken into consideration, which has been stated by an able writer on wool at no less than 2,464,609, and that they each sell for the prices that have been seen above, they must produce yearly a very large sum to the nation, which by being manufactured and sent abroad, cannot fail to be vastly increased, so that the benefit derived from them must, on the whole, be to a very large amount, probably returning, in the whole of the kingdom, not much less than a million of money yearly.

By the process or operation of spliting sheep skins, much benefit has been derived not only in the improved manufacture of the more valuable sort of the articles so produced, but in the quantity of greasy matter that is gained and prevented from being injurious in conducting the process or operation. The nature and advantages of the working of this sort of machinary, are not, however, probably, so well or perfectly known, as should be the case in all such inventions.

INTERNAL PARTS, OR ENTRAILS,

These, too, are useful for several purposes of different kinds, according to their nature; the smaller bowels are twisted and spun into cords for bow-strings, and other uses, in different manufactories, in these intentions, and afford considerable profit and advantage.

But the chief article, however, for which sheep are valuable is the

WOOL,

Which, in the view of affording this raw material for one of the extensive staple manufactures in the kingdom, the advantages it affords are almost incalculable.

MEANS OF CLASSIFYING WOOLS.

It is evident that the culture and improvement of wool must be intimately connected with that of bettering the state of husbandry

and the sheep stock which it supports, as well as the advancement of the arts to which it is applicable. whether by the invention of machinery, the institution of new articles of manufacture, or improvements in the process, by which they are brought to the condition of being exposed for sale. In this last way the improvements in chemistry, and in the arts of dyeing, have had a considerable effect. But independently of these, there are various causes which operate immediately upon the fleece, as connected with the sheep. It has been remarked by Mr. Luccock, a late intelligent writer, who has himself been engaged as a dealer in the article of wool, that "the naturalist has commonly classed the tribe of sheep by their fleece, the colour of the face and legs, by the structure of the ears, the horns, the tail and the rump. The grazier classes them precisely in the same manner, but instead of using the term *species*, he considers each class as a distinct *breed;* and in order to distinguish the varieties to which he perceives, he calls them *cross breeds*. The term, it must be confessed, arises naturally from his peculiar pursuits, and is by no means improper. The wool-stapler, on the other hand, whose attention is confined chiefly to the fleece, has his peculiar arrangement; he distinguishes the hairy sheep, that which yields wool mingled with hair, and the pure wool-bearing animal. The first of these classes is evidently unconnected with his profession. In the coats of the two, he observes numberless dissimilarities, and arranges them according to the colour of the piles, the length of the staples, the soil upon which the fleece was produced, and the country where it was shorn. These are the principal points to which he attends. The last is of no consequence, except so far as it is connected with his knowledge of the district. It then serves to give him a general idea of the wool which happens to be the subject of discourse. Hence he mostly connects with his description of the fleece, the name of the kingdom, or the county where it was grown. He speaks of the wool of Spain, of Portugal, or of Germany; of the fleeces of Sussex, of Norfolk, of Shropshire, of Northumberland, or of Scotland, and conveys to the ear of another stapler, by the epithet which he uses, an idea of the properties of the wool as correct as the graziers do of sheep, when they speak to each other of the Norfolk, the Ryeland, the Cheviot and the Dishley breeds."

It is noticed too, that the division of fleeces into distinct classes which the wool-stapler so constantly adopts; and finds so useful in his business, is intimately connected with a fact, in natural history, which has been long since established beyond all possibility of doubt; that the sheep is so constituted as to yield a fleece peculiarly appropriated to its distinct breed; and that at every annual return of the season for sheering, the same animal, under the same circumstances, will afford a similar kind of wool. If therefore the colour of the pile was once white, it will be found so again; if the staple was long it will return in the same form; if it was coarse and hairy, it will be so still. A temporary and practical alteration may be *produced* in the fleece by certain circumstances, but there is no reason to suppose that in any case, the constitution of the animal is so changed as to yield a kind of wool permanently different from that which it once afforded. The operation of slighter causes upon wool is constantly visible, and their effects have been noticed with some degree of precision, but the consequences which some of the more violent ones produce, such as affect very suddenly the temperature to

which sheep are exposed, their nourishment and their health, have been suffered to pass unrecorded, and perhaps too often unobserved. The degree of information we at present possess, induces us to attribute the slight variation which we perceive in the fleeces of the same flock, at different seasons of shearing them, not to the constitution of the animal, or to any change which takes place in its characteristic peculiarities, but to the influence of external circumstances which are perpetually varying, and seldom if ever change in a similar manner throughout two succeeding years. If the fact, that the fleeces which the sheep produces are similar to each other, be well established, and if it be not in the power of the less violent causes to produce a material difference in them; then nothing can more strongly evince how important it is for the wool-grower to mark well the peculiarities of his flock, to place no dependence on accidental and external circumstances for the production of good fleeces, but to rely entirely, and with confidence, upon the properties with which nature has endowed his sheep.

The nature, growth, and increase of wool having thus been considered, the means of improving, and arranging the different kinds; the different cumstances, and kinds of the sheep, and the qualities of the wool which they produce, in the various districts and counties of the kingdom; the manner of providing it, the quantities, and the sorts of it that are the most suitable and proper for the several uses and applications of the manufacturer; may here be attended to, and regarded, together with such other particulars, as are necessary to the full and complete elucidation and explanation of the different points and matters that relate to it.

NATURE OF THE BREEDS, OR SORTS OF SHEEP, AND THE WOOL THEY PRODUCE, AS FOUND IN DIFFERENT DISTRICTS AND COUNTIES OF THE KINGDOM.

These have much variety, not only as they are long or short woolled, but in many other particulars, which greatly interest the growers and staplers, or dealers in the fleecy produce. The whole quantity of this kind of product of the county, is likewise given in the subjoined table, from the work of the above writer, with a slight addition to the weight in each kind; but perfect correctness can only be approached in such cases, so that the real amount has the probability of exceeding that which is there put down.

LONG WOOLLED KINDS.

There are many sorts of long woolled sheep, that differ in their appearance, and the nature of their wool, as the

TEESWATER,

Which have no horns, with white faces and legs, and the wool on which is much more soft, and fit for many uses where there is an intermixture of the new Leicester with them. The fleece, which, in the unwrought state, has a favourable appearance, often is deficient in some of the highly necessary properties of such materials, for being manufactured, there is too great a shining in the hairy fibre, with sometimes a hardness and want of true growth and uniformity in the state of the whole staple, having the fleece large and hairy on the breech part, and the cast of the colour in the pile somewhat dark or dingy; but it has the favourable property of length of staple, which renders it highly suitable for the purposes of combing, and forming the coarser sorts of the worsted manufactures, for which reason the intermixture with the finer long woolled kinds should not probably be too great, as the staple may thereby be rendered not sufficiently strong and firm to endure the action of the comb in preparing of it, but be curly in parts, and of less length than is suitable for such uses and applications. In the uncrossed state, the whole is mostly of a good length, and found to suit well in such intentions. In the

YORKSHIRE,

Which are without horns, and have white faces and legs, producing somewhat less weight of fleece than the above, but rather more than some crosses of the new Leicester sort, the wool being fit for most of the purposes of the coarser kind of worsted goods. It is a wool of the less lengthy quality, which is useful in most cases where the shorter kinds of the long wools are proper, and at all applicable. In the

LINCOLNSHIRE,

Which is a breed or sort of sheep, which are also hornless, and have the faces and legs white; being, from the nature of their situation and keep, capable of being favourably productive of long wool, of perhaps the best kind, and from which, in all probability, the growth of such wool first took its rise; the sheep of the district having, for a vast length of time, supplied a fleece of great value and importance, to the most extensive manufacturing district, for woollen articles of the more coarse sorts, in the kingdom. The long wools of other midland situations, being much more late in rising to any degree of excellence and valuable consideration. But the true breed of these sheep is now difficult to be met with, in consequence of having been so much crossed with the new Leicester sort, which some, perhaps, rightly think, to have had the effect of lessening the weight of the fleece, as well as that of the carcass, and by rendering it finer and more soft, has caused the loss of that toughness which is essential in the best kinds of wool of the combing sort. In some parts of this county, where the valleys are rich and extensive, the land is perfectly suited for the raising large-sized sheep, and such as produce long wool, with a large weight of mutton; it would, of course, in such, be quite improper, and greatly disadvantageous, to have smaller and finer-woolled breeds, that produce but little weight of either meat or wool, however they may have been recommended by those who are not acquainted with the nature of the growth, production, and use of wool of different kinds. For there, were it possible, to raise fine wool in such rich pasture-lands, which has been shown to be quite the contrary, it would be very highly unprofitable to have them introduced, as the growth of large sheep, with long combing wool, is so much more suitable and important in such cases, besides affording so much more profit and advantage in different other ways, as that of working such wool into the kinds of goods it suits, in preference to having such as is only proper for those that are of a finer kind, far more employment being afforded, and greater returns made for the benefit of the public. Besides, by the introduction of such fine-woolled breeds and kinds of sheep, in such circumstances, there would be no little risk of annihilating our manufacture in worsteds, which is so important and valuable, in no very great length of time, in consequence of the lightness, fineness, and tenderness, of the wool that would be produced in the place of long and heavy fleeces, with a much larger weight of meat. There is probably no situation of such pastures, where such small sorts of fine-woolled sheep can be so beneficial as the large, as the failure of most or all such trials have sufficiently proved, both with the perfect and mixed sorts.

In this, as well as some few other districts, which are so perfectly well adapted and fitted for the raising of heavy long-wools, and fleeces of that sort which are in such demand, for the making of the more coarse kinds of woollen articles; it would most likely be to the advantage of the breeders and keepers of sheep, to have both sorts of such wool *raised* distinctly in the most perfect manner, and to suit the kind of coat of each to some determinate point, in regard to the properties of it, so as to leave no sort of difficulty in the choice by the manufacturer, as the diversity in the uses to which the two different kinds of this material are applicable, is as great as can be conceived; so that the utmost attention should be paid, to have them kept quite free and perfect from each other, and without any kind of intermixture.

The wool from sheep fed on such lands may be less coarse than that where the keep is of the root kind. For though, on such rich pastures, the wool, in different cases, was formerly liable to get stained, and to be much filled with the seeds of hay, by the management which was often used with the sheep, as well as to become jointed in some part of the staple, and there to be rendered too brittle and tender, so as to be productive of loss and imperfection in the combing process; yet, in the opinion of some dealers in this sort of material, even with the waste they sustained, there was a peculiar softness and mellowness excited in such fleeces, that gave them much advantage over those raised in feeding sheep by means of artificial food: and that when made into articles of the worsted kind, there was less harshness and roughness in their being felt by the hand than what is now the case. The less fineness and softness of worsted goods in general now than formerly, tends likewise to the proof of the same thing. There can be no doubt of wool being rendered more fine and soft by poor and sparing keep in all such cases; and getting more rough and coarse by too full keep, of whatever kind, but especially of the rape or turnip sort, as will be clearly seen above, in speaking of the growth of wool, and still more fully explained by Mr. Bakewell, in his work on wool; but which is probably very justly con-

sidered to be caused by the quantity, rather than any thing in the nature or quality, of such food or keep.

It is probable, that by some such means as the above, the largest quantity and most fit kinds or qualities of wool, in some different manufacturing intentions of this country may be provided, by this kind of sheep, and be best prevented from decreasing, which, in being too much crossed, may be very considerable, so as to greatly injure such manufactures, and lessen the profits and advantages of individuals in the keeping of such sheep. The Holderness sort are less in the fleece, but otherwise little different from those of other parts of the district. In the

NORFOLK

Long-woolled kind of sheep, there are no horns, and the faces and legs white, the fleeces in which are, however, in size and weight, nearly the same as in the less sorts of the above, but the qualities hardly so good, as they are fed more on artificial food, or a fuller keep. In the

CAMBRIDGESHIRE

Sheep, of the same kind, which have no horns, but are white in the faces and legs, the fleeces are much of the same weight, but the wool, in its quality, somewhat less harsh to the feel, and with a greater degree of softness, being fit for the better purposes of the same kind. In the

HUNTINGDONSHIRE

Sheep, with long wool, they are hornless, having the faces and legs also white in the colour, but the fleeces are much less heavy and valuable in some of their qualities, though applicable to similar uses. In the

LEICESTER,

As well as the Northampton, the Rutlandshire, the Warwickshire, the Staffordshire, the Kent, and the Romney Marsh sorts of sheep, there is no horns, but white faces and legs, with some slight differences in the colour of the wools, which are of the less heavy and more short long-woolled kinds, the properties of which, from their differing in softness, length of staple, and some other qualities, as depending upon their mixed nature, are perhaps not so extensively applicable as the Lincoln, but of very great utility for different purposes in the worsted manufactories, in which they may, most probably, become the fittest, where the crossing in the raising of the sheep has not been carried to too great an extent, so as to render the fleeces of them too light, and, in their qualities, not so good or suitable for such manufacturing uses. They, on many of the less rich sorts of pastures where long wools can be grown, may, however, not unfrequently be found, especially under such careful breeding, an advantageous and more beneficial kind of stock than that of the true Lincoln breed, which is too large for the perfect growth of such long wool, under such circumstances of keep, as with these there will be a better supply of both wool and mutton than could be afforded by them in such cases, which will, of course, give more profit to the sheep-farmer. In the

DEVONSHIRE

Sort of sheep, with this kind of coat, there are no horns, but the faces and legs white and a greater weight of fleece, but more applicable for some uses of such wool, than some others of the same length and kind. In the

COTSWOULD, OR GLOUCESTER,

Sort, the sheep are not horned, but the faces and the legs white, as in the others of the same nature of coat, the fleeces in which are rather less heavy, but the wool suitable for uses of the same kind by the manufacturer.

SHORT-WOOLLED KINDS.

In these, there is still a greater difference than in those that grow and afford the long heavy wools, which require to be equally noticed and considered in many of the sorts. In the

NORFOLK,

Which stand at the head of the table below, in the short-woolled sorts, the sheep are horned, with black faces and legs, the wool of which has much shortness, with a fineness to a certain degree, and is often much shed and lost on some parts before the season at which the sheep are clipped. The flatness in the state of the fibres, or filaments, which constitute the fleeces of these sheep, are considered as a quality highly valuable, and the truth of the growth of the hairy parts, a property that is constantly favourable in the use of the material; but it is not unfrequent to find such wool kempy, and filled with too many hairs of tne grey cast. Wool, of the short kind, in the most perfect state, requires to be closely set on the skin, not long, but regularly even on the top, with a properly full and regular supply of yolk, as has been already seen, and is constantly the case in the Spanish fine-woolled breed. It has been noticed, that, in these sheep, the wool is formed by numerous small fibres, which are laid in the parallel direction to each other, and which are capable of being separated through most part of their length. But this

is, most probably, not only the case in this, but all other kinds of wool, as may be seen in what has been said above, when considering the nature and growth of wool.

In these sheep, where an improvement of the fleece has more lately been fully produced, the wool is said to be better fitted for the purpose of forming cloth, having the felting property in higher perfection, and, in a great measure, free from that sort of elasticity which often becomes injurious in the making of the above manufacture. The bettering of the wool of these sheep is, therefore, very material, as producing cloth of an improved quality. In the

SUFFOLK

Sort, the sheep have horns, with black spotted faces and legs, as well as the Cambridge, but in the Huntingdonshire and Bedfordshire, there are horns, with black faces and legs; and the Essex have horns, but the faces and legs are white. The sheep of these several counties and districts vary too in the qualities and properties of the wools and fleeces, so as to render them more or less useful in the manufacturing of cloth goods, as well as more or less profitable in the keeping as sheep-stock. Their wools are all short; but with a variety in the lengths, that may be more or less suitable in different cases, and in some of them than others. In the

SUSSEX, or SOUTH-DOWN

Kind, the sheep are without horns; in some with black faces and legs, while, in others, these parts are grey; fault has been found, by dealers and manufacturers, with the defect of evenness in the staple, and the want of regularity in the quality of the wool; that which is grown on different parts of the sheep varying too greatly, as the sides and shoulder parts from the back, and in the breech parts becoming all at once rough and coarse. There is, likewise, a very unfavourable notion prevalent of this sort of wool, for the use of manufacturing some of the coloured more thick kinds of cloths, in consequence of its being proved, in such use, to be so defective in the felting property, which is so indispensably necessary in the fabrication of such goods in a perfect manner; which defect is often supposed to depend on the nature of the soil on which the sheep feed, as being of the loose chalky kind, and as giving a hardness and harshness, with a too great tenderness, of the pile. How far this is really the case, will probably be, in no great length of time, determined, by the full trial of the fine-woolled Spanish sheep on the same pastures; and whether it is caused altogether by the soil, or in part by the inherent quality of the sheep; as well as whether it is to be prevented or removed by the greater closeness of the coat, and the supply of yolky material, which must be the case in the trials with such a breed of sheep: there can now be scarcely any doubt of such sorts of soils, when their particles are mixed with the fleece, being hurtful, in changing the nature of the wools of the sheep pasturing upon them, so as to quite alter their distinguishing qualities. This may be seen, in what has been already advanced on the nature and growth of wool, as well as in the useful work there alluded to; and that the use of proper oily or greasy substances will almost to a certainty remedy the mischief. It, of course, deserves the full trial of the sheep-farmers of all such districts. There are some Kent sheep, that are hornless, and coloured in the face and legs; but the

HAMPSHIRE,

As well as the Surrey, have no horns; but are white in the faces and legs, having, in their wool, no peculiar properties that are material to either the dealer or manufacturer. In the

WILTSHIRE

Sheep there are horns, with white faces and legs, having the wool, for the most part, in a pretty regular and even state, with a whiteness and softness of the pile, and a high degree of cleanness, or freeness from all sorts of dirt; but in the fleece there is a scantiness, which is very unfavourable to the sheep and the wool-merchant, there being little or no woolly covering on the parts where it is so essential, as under the belly, and on the inferior portions of the thighs, but there is a freeness from what is termed dag-locks, and short wool, which is beneficial in the purchasing of it, by the dealer. In the

BERKSHIRE,

The sheep are without horns, having spotted faces and legs, being mostly considered as affording a fleece, the wool of which is well fitted for the uses of the cloth manufacturer, in some of his less fine fabrics, where a certain thickness, equality, and softness is requisite. But there are sheep in this district, that vary much in the size and quality of the fleece. In the

OXFORDSHIRE,

The sheep differ somewhat in the size of the fleeces and other respects, as they are found in the north and south divisions of the county; but they are destitute of horns, and have the same coloured faces and legs as in the above. The wool is rather inclining to length in the staple and nature of it. In the

BUCKINGHAMSHIRE

Sheep, there is a want of horns, with mottled faces and legs, and some variety in the wool, in its qualities and the uses for which it is proper; but on the loose calcareous soils of the chalky kind, it affords a wool that is somewhat short in the fibre, but which has a softness and pliability in its nature, which adapts it to the purposes of the cloth-maker. In the breech parts of the fleeces, there is, however, very frequently a large extent of the more coarse sort, occasionally much blended with kempy hairs, which is of a very unfavourable quality for most purposes. In the

HERTFORDSHIRE,

Which are sheep with horns, and with white faces and legs, having the wool of the fleece mostly rather regular and even, with a goodness of colour, cleanness, and somewhat softness of quality, that fit it for some of the uses of the cloth-maker, in a tolerable good manner, as in that of the Wiltshire kind. In the

MIDDLESEX

Sort, they are equally with horns, and the same kind of coloured faces and legs as in the above, but with more variety in the qualities of the wool of the fleeces, which are larger and more suitable for some particular uses of the cloth manufacturer. In the

DORSETSHIRE

Kind, or those of the western district, which have horns, and white faces and legs, there is a shortness, fineness, and closeness in the quality of the wool, that render it greatly valuable for those who manufacture goods of the woollen kind, though certain portions of it have been thought, by some dealers, to have too much length and coarseness in them for such uses; and its being filled with sandy and such-like matters, has sometimes caused it to be found fault with by the manufacturer. In the

PORTLAND ISLAND

Sheep, which have horns, and the faces and legs in which are greyish, or of a spotted mottley cast, the fleeces are but small; and though the quality is, in some cases, inclined to faultiness, in the coloured hair, it is suitable for some uses of the cloth-maker. In the

DEVONSHIRE

Sheep, which are horned, with the faces and legs white, there is a thinness and coarseness of the staple in the wool, with a moderate size of fleece; but the hind parts of it are often rough and of little value. The

CORNWALL

Sheep, which are horned, with white faces and legs, have the wool divided into two separate and distinct qualities, one of which is rough and of little worth for almost any use, while the other is of a nature and quality to fit it for the making goods of the worsted kind, being, for the most part, fabricated into the articles which are termed serges; the fleeces are of rather the larger size, in both sorts. In the

SOMERSETSHIRE

Sort of sheep, there are horns, and white faces and legs; but the fleeces are rather small, and the wool not remarkable for any particular quality, that suits it to any use of the manufacturer in a peculiar manner. In the

GLOUCESTERSHIRE,

Which are sheep of two kinds, as those of the Wiltshire and mixed Ryland sorts, and both of which have horns, and the faces and legs white, the wool having the qaalities and properties of these kinds of sheep, is noticed in speaking of them under the heads to which they particularly belong. The fleeces are not large, in either case, being only of the rather medium weights. In the

EXMOOR

Sheep, which have horns, with white faces and legs, and the wool rather heavy in the fleece, in consequence of its being somewhat longish. It is of a yellowish cast in the colour, and in some degree soft and silky in the quality, but considered as forming cloth that has too much harshness in its nature, by those who are engaged in the fabricating of it; so that it is probably more suitable for some other purposes of the wool manufacture. In the

HEREFORDSHIRE

Sheep, there are no horns, but the faces and legs are white, and the wool of the fleeces, which are but small, excellent in quality, so as to be supposed superior to that of any other of our native breeds of sheep. It has been said to be of the most perfect kind, in some samples, by a most able judge of the matter, as being very completely grown, with a very thick staple, and unusually full in the pile, with extremely much softness and delicacy in the feel, the colour being most beautifully white, with the hairy fibre extremely fine, and the length hardly reaching half an inch. But this is far

from being the case with a greater part of the wool of the district; which, on the more open and sandy parts, is considered as being somewhat thinnish, of a harshish quality, as to the feel, and not of sufficient proof, in consequence of being raised with too small a supply of yolk in the sheep, and in the enclosed lands somewhat too thick, the colour of the yellowish cast; while on the heaths, commons, and more poor sorts of land, with the same yellowish tinge, there is a softness and silkiness, which is of great value in its qualities; but there is sometimes a want of cleanness in it, and occasionally kempy hairs are apt to rise. The mixing of the fine-woolled Spanish breed of sheep with this, may probably, in time, render the wool of these native sheep of the best kind for the several uses to which it is put by the manufacturer; and which, a more perfect mode of washing would, in all probability, wonderfully expedite. In the

MONMOUTHSHIRE

Sheep, which have no horns, but are white in the face and legs, the wool of the fleeces, which are very small, has a yellowish cast in the colour, with some degree of raggedness in the coat, but is fine and short in the quality, which render it useful in particular manufactures; but it varies greatly in different parts of the district, and, in some cases, the fleeces have larger sizes than the usual ones. In the

WORCESTERSHIRE

Sheep, there is no horns, but the faces and legs white, as in the above fine-woolled sort, and the wool, for the most part, short and of a pretty perfect growth, with some degree of softness and silkiness in the feel of its fibres, which is favourable to its quality; but there is in some places a redness of tinge given by the soil. The fleeces, in some situations and parts of the district, which are afforded by the sheep, are of a good size for such sheep, and the whole might probably be rendered larger, by a proper intermixture with other sorts, and the wool receive no injury, but be rather bettered in its qualities. In the

SHROPSHIRE,

Which are without horns, with the faces and legs white, for the most part, but in some places black, mottled, or spotted, in the face parts; the wool of the fleeces, which are smaller in some divisions of the district than others, is usually of a good and proper quality for the fine cloth manufacturer, but has the pile not unfrequently tinged of a reddish cast, by the particles of the soil, and, in different instances, there is a considerable degree of kempiness, and the tops of the staple spiry and coarse, which are unfavourable for several uses of the cloth-maker. These sheep are capable of being much improved in the qualities of their wool, and which is highly desirable to be accomplished. In the

STAFFORDSHIRE

Sheep, there are differences in the kinds, as some without horns, with white faces and legs, and others with horns, that have brown faces and legs; and the wool of the fleeces somewhat varies with that of the sheep, as well as that of the size of the latter; but there is usually a fineness in the woolly material, and the fleecy coats mostly short in the staple, like some of the more fine native breeds. Little care has been taken in the breeding or improving these sheep, in regard to the qualities of the wool for the use of the manufacturer. In the

WARWICKSHIRE,

Which are hornless, but with brown or white faces and legs, the wool of the fleece is rather long, but of good growth, wanting that fineness, shortness, and high degree of softness in the quality, which is proper for the fine cloth-maker; yet, when longish, it suits other purposes of the wool manufacturer, as those of the worsted kind, in some cases, with pretty good success. In the

LEICESTERSHIRE

Sheep, there are kinds which have no horns, but with brown faces and legs, that give a wool that is of fine growth as in some of the forest parts; and others that are of the poorer kind, in regard to keep for such animals; but the quantity is rather small, and the quality but little attended to, either in respect to wool or mutton. In some

LINCOLNSHIRE

Sheep, which have no horns, but the faces and legs white, there is a wool afforded, in a slight quantity, in some parts of the district, that has not the length of more than four inches, and which is rough and coarse in the hairy fibrous parts, with a tenderness in the quality, the staple portions having a separated growth, in some cases, and the colour but indifferent, which render it little desired by the manufacturer. These sheep can hardly be kept on such land, to the best purpose and benefit, in respect to the growth of wool, and, are not capable of improvement in that view. In the

NOTTINGHAMSHIRE

Which are a sort of sheep that, in one kind, has horns,

and the faces and legs black; but in the other intermixed new Leicester kinds, there is no horns, but the faces and legs are of the same colour; the wool of the fleece, which is small in the former, but rather large in the latter, has a fineness and shortness in the first, that render it well fitted to the cloth-manufacturer's use; but in the other, which is of much greater length in the staple, there is only a middling degree of fineness, but the colour is fine, and there is a cleanness and softness in it, that suits particular uses in the making of some of this sort of goods. In the

DERBYSHIRE

Heath sort, which are horned, with black faces and legs, the wool of the fleeces have a leaden sort of cast in the colour, but differ in the different sorts of soils, being of the better quality, on those of the grit or sand-stone kinds, than on the lime-stone. There is, in the pile of them, a softness, and sort of silkiness, with a flexibility that is greatly useful in their manufacture. It has somewhat too great a length in the fibre, but possesses the property of felting in a high degree. The fleeces are rather small in their size and weight. In the

CHESHIRE,

Which are hornless, with black or brown faces and legs, the wool of the fleeces, which are very small, is short, but fine in the quality, being very applicable for the manufacture of articles of the fine cloth kind. In the

LANCASHIRE

Sheep, which are horned, with white or mottled faces and legs, the wool in the fleeces, which are very much larger than in the above sort, so as to be of a good size in some stocks, in the Crag or Silverdale kind, is of a fine sort, with not too great a length, but close on the sheeps' backs, and rather full of volk, being highly valuable for the good qualities which it possesses, and which are capable and proper to be still further improved; but there are other sheep in the district, in which the wool is much inferior in the quality, not being fit for the manufacture of cloth, from its harsh and kempy qualities. In the

YORKSHIRE,

There are several different kinds, besides those already described, which have horns, and white faces and legs; the wool, in the fleeces of those of the North Riding, which have horns, and mottled legs and faces, there is much openness, looseness, and coarseness of their qualities, especially on the hinder parts of the sheep, and has the pile of that often much intermixed with hairs of the brownish or grayish cast. That in the fleeces or coats of the East Riding sort, which have no horns, but black faces and legs, although somewhat long, are by no means suited for the purposes of combing, from the defects which it possesses in its fibrous qualities: that which is of the wold growth, has occasionally a sort of whiteness in its colour, but without the necessary clearness, and that kind of shining property which is required. there is a weakness in the staples, as being single and detached, having a straightness and elasticity in the pile of it: and in the West Riding district, where the horns, faces, and legs are mottled, as first noticed, the wool of the fleeces is various, being in some of them of much greater length than in others, with a greater degree of elasticity. In the Penniston district and kind, the sheep have horns, with mottled or spotted faces and legs, and the wool of the fleeces possessing a shortness and fineness in its quality. In the

WESTMORELAND

Sheep, which are mostly without horns, with black faces and legs, but some horned, with mottled, spotted, or white, in these parts, the wool of the fleeces is somewhat coarse and hairy in quality; but in others it is more fine, with less of the hairy property, so as to fit it for better uses by the manufacturer. In the

CUMBERLAND

Sheep, which are some horned and some without, with the faces and legs mottled, black, spotted, and white, have the wool in the fleeces, which are not large in the more elevated mountain sort, of a rather coarse and hairy interspersed quality; but in other kinds of the less rich pastures there is a finer sort of wool, with better form of sheep. In the

HARDWICK

Sort, which are without horns, with speckled faces and legs, the wool of the fleeces, which are but small, is moderately fine in its quality, but capable of being rendered much finer and better for many uses of the manufacturer. In the

NORTHUMBERLAND

Sheep, which are hornless, with black faces and legs in some, but in others white or spotted, the wool of the fleeces, which are moderately large, is said to have much softness in the quality of it, in consequence of the practice of greasing, which is regular and constant in that district, and which gives it a superiority over others for many uses of the manufacturer. In the

CHEVIOT

Hills sheep, of the same district, which have no horns, but white legs and faces; the wool of the fleeces, which are not large, is fine in the quality, short, and highly esteemed, having an extraordinary degree of softness and clearness in the pile, which gives it much usefulness to the manufacturer. In the

MUGGED

Sheep, of the intermixed nature, with the new Leicester or other kinds, which have no horns, but white faces and legs; the wool of the fleeces, which are rather large, is somewhat long, and much curled, having the disposition to felt naturally on the backs of the sheep, yet too tender in the quality to be useful in any great degree to the manufacturer of the material. In the

WELCH

Sheep, both of the north and south part, which are some of them with horns and others without them, the wool in the fleeces, which are but of a small size, is very short in the staple parts, but the pile has a degree of fineness; yet the disposition to a hairy coarseness and kempy quality in such wools, is perhaps greater than in most other kinds. In the

ISLE OF MAN

Sheep, some are with and some without horns, and the faces and legs white; the wool of the fleeces being, in the higher parts, of a short kind, but on some of the more low situations long; the sheep being similarly marked in the face and leg parts. In some of a particular sort, which has been long on these lands, the wool is said to be of the dark snuff-colour. In the

SHETLAND

Sheep, which have no horns, but the faces and legs differently coloured in different instances, the wool of the fleeces, which are very small, fine, and cottony, or beavery in its qualities, being fit for almost any fine uses of the manufacturer. In the

IRISH

Sheep, which, in some sorts, have horns, and white faces and legs, but in others no horns, with the same coloured faces and legs, the wool of the fleeces, which are of a rather small size in the first kind, but large in the latter, is short, but without having any of the more valuable properties to recommend it in the former case; while, in the latter, it is long, but without possessing almost any of the better qualities that are necessary for the manufacturer of such wool; they both stand in need of much improvement, to render the wool of them the most beneficial to the country. In the

MERINO,

Or fine-woolled sort of Spanish sheep, which, in the males, have mostly horns, but, in the females, commonly without them, the wool is, in the fleeces, the most equal and fine for the purposes of the clothier, of probably any known kind of domestic sheep, and the most largely used, in such intentions, of any sort in this as well as other countries; this is more the case, in whatever state of fineness it may be, than in any of the native fine-woolled kinds of this country, which is probably the cause, with its softness, that renders it so greatly applicable in the fabrication of fine cloths. It varies so much, however, in the stocks, in different cases, as to be doubly valuable in some to what it is in others. The different sorts of it are applied to different purposes by the cloth manufacturer.

TABLE I.

SHEEP DISTRICTS, BREADTHS OF LAND, AND PRODUCE OF WOOL, IN ENGLAND AND WALES.

LONG WOOL.

DISTRICT.	COUNTY.	No. of Acres.	No. of Sheep.	Common Weight of Fleece.	Most Weight of Fleece.	No. of Packs.
Teeswater	Durham	100,800	67,200	9	18	2,520
	Yorkshire	61,250	14,310	8	12	477
Lincoln	Holderness	127,680	84,000	8	12	2,800
	Lincoln, rich land	413,875	1,241,625	9	29	46,561
	—— marshes	175,000	87,500	8	12½	2,916
	—— miscellaneous land	758,485	505,657	8	12¼	16,855
	Norfolk	55,428	38,500	7	12	1,223
	Cambridge	187,600	41,688	8	11	1,390
	Huntingdon	87,500	87,500	7	10	2,552
Leicester	Leicester	398,650	380,528	7	10	11,100
	Northampton	560,000	640,000	6	9½	16,000
	Rutland	117,000	114,000	5	10	2,370
	Warwick	182,875	160,000	5	10	3,333
	Stafford	14,000	3,720	7	12	113
Kent	Romney Marsh	46,920	185,000	7	12	5,400
	Other Marshes	65,000	108,330	7	12	3,160
Devonshire	South Hams	387,500	193,750	8	18	6,458
Cotswold	Gloucester	200,000	200,000	8	14	6,666
		3,939,563	4,153,308			131,794

Slaughtered 1,175,770 Sheep.

195,128 Producing long-skin wool 5,720 Packs.

Carrion wool 286

5,134

Neat total 137,228

TABLE II.—*Produce of short Wool.*

DISTRICT.	COUNTY.	No. of Acres.	No. of Sheep.	Weight of Fleece.	Most Weight of Fleece	No. of Packs.
Norfolk	Norfolk	1,260,572	683,704	2	3	5,697
	Suffolk	817,000	497,000	2½	3½	5,176
	Cambridge	817,600	67,744	4	5	1,128
	Huntingdon	144,000	108,000	4½	6	2,000
	Bedford	268,800	204,000	5	6	4,250
	Essex	778,400	519,000	3	5½	6,486
	Sussex Downs	211,200	316,800	2	2½	2,640
	——— Low Lands	623,840	547,000	3	2½	6,837
	Kent	728,000	524,475	3¼	4	7,000
	Hampshire	774,900	516,600	3	4	6,457
	Isle of Wight	87,500	61,000	3¼	3½	800
	Surrey	327,600	283,000	3	4	3,540
Wiltshire	Wiltshire Downs	437,000	583,500	2¾	4	6,684
	——— Pasture	235,000	117,500	3	3¼	1,460
	Berkshire	408,800	306,600	3¼	4½	4,151
	Oxford	380,730	304,584	Various.	7	5,303
	Bucks	408,800	222,968	3	4½	2,787
	Herts	369,600	277,000	4¼	4½	5,297
	Middlesex	76,000	45,000	4	5	750
Western	Dorset	700,000	632,240	3¾	8	9,880
	Devon	873,700	436,850	4	6	7,280
	Cornwall	812,000	203,000	4	6	3,382
	Somerset	851,200	500,700	4½	8	9,338
	Gloucester	528,000	355,000	Various.	5	5,400
Hereford	Hereford	672,000	500,000	2	3	4,200
	Monmouth	322,625	177,619	Various.	2	1,431
	Worcester	369,600	330,504	3½	8	4,820
	Shropshire	739,200	422,034	2½	4	4,397
	Stafford	549,360	183,120	2	3	1,526
	Warwick	365,925	182,962	3	4	2,287
	Leicester	50,000	20,000	3½	4½	291
	Lincoln	309,120	123,648	5½	7	2,833
	Nottingham,	435,680	255,147	Various.	3	4,112
	Derby	553,280	362,400	3	3½	4,530
Heath	Chester	588,000	65,000	Various.	4½	926
	Lancaster	952,000	310,000	3½	5	4,522
	York, West Riding	1,429,250	383,122	Various.	6	6,678
	—— East Riding	454,720	306,240	5	6	6,380
	—— North Riding	1,200,000	365,326	Various.	4½	5,939
	Westmoreland	431,200	378,400	3½	4	3,262
	Cumberland	856,800	378,400	3½	3½	5,915
	Durham	414,400	159,385	5	5½	3,320
	Northumberland	1,108,800	538,162	5½	6	12,333
Welch	North Wales	2,035,200	683,040	2	3	5,692
	South Wales	2,284,800	571,200	1½	2	3,570
	Isle of Man			2¼	2¼	
		28,412,202	14,854,299			202,737

		Sheep		Packs Skin Wool.	
Slaughtered	4,221,748		$\frac{3 \cdot 25}{2}$	28,580	
Carrion	211,087			1,429	
Slaughter of long-wool sheep	980,642		3	12,258	
Carrion of ditto, brought forward				286	
					42,553
				Total of short wool	245,290
				Ditto long ditto	137,228
Wool from lambs slaughtered				2,918	
——— shorn				7,800	
					10,718
				Grand Total	393,236

It is farther stated, too, in respect to the weights of the coats of the different kinds of sheep, that

	lbs.	*oz.*	
The average fleece of England is nearly . .	4	8	
——— short wool	3	4	
——— long wool	7	10	
——— stock per acre			$\frac{10}{32}$sh.
——— long woolled			$\frac{10}{10}$—
——— short ditto			$\frac{9}{22}$—
——— produce per acre, long-fleeced wool	8	0	
——— in short	1	5	
——— in long skin . . .	0	5	
——— in short	0	4	
—— average, in skin wool of the kingdom, nearly	0	5	

It has been supposed, that the wool of Scotland may probably be stated at 70,000 packs; the major part of which, especially that raised in the Highland parts, is of the most coarse nature.

But that, of the quantity of that which is of Irish growth, no satisfactory estimate can be given, though it cannot be large. The returns of the custom-house, in 1816, it is said, shew, that the quantity imported from that part of the United Kingdom and the Isle of Man, was of the amount only of about 2,600; while the value of the woollen goods, imported from this country, was upwards of 500,000*l.* sterling. As the woollen and worsted manufactures in Ireland are no where on any large scale, probably 60,000 packs may be the full estimate of the annual clip there, which was, it is supposed, the estimate given nearly a century ago.

All such tabular, or other estimates of calculation as the above, can, however, only be taken as approaching to exactness; as it is most probable, that the real amounts in many of the statements, in consequence of the very great improvements that have been made since they were taken, are not perfectly what they ought to be, but they unquestionably approximate the most to the state of correctness of any that have, perhaps, been hitherto formed on the subject, as being founded on the best possible data, that of the extent of surface on which the sheep are believed to pasture, and the number kept *per* acre in each district. The estimate made before the House of Commons, in the year 1800, by those in the wool trade, was considerably more, as 600,000 packs, which seems to have been considered as greatly exceeding the true amount, in constructing the tables that have been given above. Therefore, the medium between the difference of the two estimates and statements, may perhaps be nearly about the real truth.

FITTING WOOL FOR MANUFACTURING USES.

It is stated, by an able writer on this subject, that "the improvement of wool, it should ever be recollected, consists in rendering it better adapted to manufactures. Alterations which fail of this grand purpose, if produced by design, are trifling and contemptible. If they render it less susceptible of an application to useful purposes, they and the abettors of them deserve the severest reprehension of an enlightened agriculturist, who declares, that the debasement of the fleece is an act of treason against the state. But manufactures are so very changeable, and their demand for the raw material has been so uncertain, in past ages, that the grazier ought to observe, with the keen eye of a statesman, the public and the domestic occurrences of the moment, if he would produce, from the backs of his sheep, a commodity which shall possess the highest intrinsic value, and be most assiduously sought after."

The causes which produce the great varieties in the wool of sheep, so as to fit it for so many different uses, are extremely numerous; as the breed of sheep, which affects the pile or fila-

ment, the particular form of which may probably depend upon the nature of the pore of the skin, through which it passes; it being, in some families of these animals, perfectly round and even, while in others it is uniformly flat and smooth. This diversity of arrangement has long demanded more regard than it has met with, but has lately been more fully inquired into, as already seen, when speaking of the nature and growth of wool.

YOLK.

This has also considerable influence on the properties of the wool. It is the peculiar unctuous secretion which exudes itself through the skins of sheep, and which, by intermingling with the pile of the wool, renders it soft and pliable, and in proper condition. It has somewhat the same effect on it which oil has upon a thong of leather, when kept in and perfectly saturated with it. The disposition to the production of this substance in sheep, is favourable to the valuable properties of the wool, and should be attended to by the sheep farmer in fixing his stock, as more fully and perfectly explained in considering the growth and increase of the fleecy covering of sheep.

QUALITIES OF WOOL.

The nature of the climate, in regard to heat, as well as moisture and dryness, likewise greatly affects the nature and quality of wool; the state of the pasture and the nature of the herbage, have a still further influence on the qualities of the wool which is afforded by sheep; and the properties of the soil, as well as the care which is bestowed on the animals, are not less important in the effects which they have on the quality of wool, than other causes, as already seen.

With respect to the excellence of wool, it is observed, by the above experienced writer, that "that is evidently most distinguished for good qualities which may be fabricated into a valuable article, by means of the implements in common use, in the most perfect manner, and with the smallest degree of labour and expense. When the fleeces are separated from the backs of the sheep, they are universally found to contain a variety of different kinds of wool, very frequently suitable to the fabrication of articles very dissimilar in their nature, and adapted to processes in the manufacture of a description totally different from each other. The chief business of the stapler is, to separate the portions of this mingled mass, to distribute them in their proper order, and to supply the manufacturers with the peculiar kind of wool required by the goods which each of them makes. This occupation constitutes him the agent of the manufacturer, or, rather, in his hands wool passes through the first stage of the process, adapted to render it useful; and it becomes his business and his interest, to watch the state of trade—to notice the changes in the demand for different articles—to remark the nature and the qualities of wool, and to point out to the grower the properties of the fleece, which are successively of superior or of smaller importance."

Most of those who have formerly, as well as more recently, examined and considered the nature of wools, appear not to have had the knowledge of any particular differences in them, than those of the state of fineness or coarseness which they possessed, in the property and state of the fibre; but there is another, which forms a great deal more valuable distinction of their character, which is, the length of it. The different kinds of wool, as those of the long or combing, and the short or clothing, vary more from each other, than

those of many different other wrought articles, in the uses for which they are differently suitable, and capable of being applied, as well as in the manner of their manufacture. On this and some other accounts, the wool of sheep has been usually arranged and considered as of two distinct sorts, the short, or that which is useful for clothing purposes, and the long, or that which is beneficial for combing uses, each of which sorts are capable of further division into various kinds, as their states of fineness may be; which is the proper business and employment of the person who sorts the wool.

SORTING WOOL.

This art, which was almost wholly unknown a few centuries ago, was very imperfect, but which has been considerably improved during the latter part of the last hundred years; and as the division of labour in most other branches of manufacture has contributed to their advancement, so, in the fabrication of woollen goods, it has produced very essential benefits.

In this business, they are, it is said, less nice in Spain than in this country, they merely tearing the fleece across the loins, taking off the skirts, and dividing the remainder into three parts, without much discrimination. But here it is the interest of the workman, to be more scrupulous in the separation of the pile, having introduced a much greater number of sections into his method of breaking the fleece. "There are here," it is noticed, "three general kinds of fleeces, each of them being sorted in a manner different from the others. The finest includes all those adapted to the fabrication of woollen articles, and comprehends by far the larger proportion of the wool of the island; the second comprehends the longer pile, that which is suitable to worsted goods; and the other is confined to wool of a medium length, that which is used in the hose trade. The number of sorts into which the fleeces of each class are divided is always arbitrary; but custom has introduced an imperfect kind of system, to which most staplers conform. The number of sections adopted in the hose trade is generally about six or seven, and the names applied to them few, but distinguished in the inferior divisions by the different terms as below. The fleeces suitable to worsted goods, when considered upon a scale comprehending most of that kind of wool produced in the kingdom, admit of about sixteen sorts, half of them obtained from the wool of sheep which have been shorn more than once, and the others from hog fleeces.

In sorting the short clothing wool, the fineness of the fibres of it can alone be ascertained, for any useful purpose in the woollen manufacture, by the sorter or dealer, who has been long in the habit and practice of discovering and nicely discriminating the very slight but important differences, which are not to be distinguished by the eye of the common person, and hardly to be determined by the most powerful instrumental aid. From the results of the trials that have been made by different experienced persons, the thickness of the fibre of the finest wool of the Spanish kind, may perhaps be estimated to be not more than the fifteen hundredth part of an inch; and that of the finest native wool of this country, to be from twelve to thirteen hundredth parts of it; while the inferior sorts gradually rise in thickness to the six hundredth part of an inch and more. An imperceptible difference in the size of the fibres, by an inexperienced person, may occasion a vast difference in the value of the wool. The fineness of the fibre in wool is, therefore, a matter of much consequence to the cloth-

maker, and a quality which is deserving of very great attention; and the same is the case with the regular fineness of it, which is sometimes greatly different. It is, of course, of much importance for the wool-sorter, to be able to nicely discriminate differences of these and some other kinds.

From the fleece of the Merino sort of sheep being more regularly fine, whatever the degree of that may be, than any of the native fine-woolled breeds of this country, it admits of being divided into four sorts by the stapler; namely, the *refina*, *fina*, and *tercera*, the coarse portion from the head and shanks not being exposed for sale. In trade, these sorts are known by the letters R, F, and T; and, on the common average, there will be in each fleece about three-fourths of the first or best sort; and the second, as well as the third sorts, will also comprehend a large portion as fine as the best; but which, from being shorter, more imperfect in colour, or blended with coarse hairs, stand in need of the locks being separated from the best kind.

But in the fleeces of the native sort of sheep in this island, whatever may be the fineness of some portion, the proportional quantity of the best kind very seldom amounts to more than a third part, and, is very commonly, not more than a sixth part, of the sheep's whole covering.

There is great diversity in the value of the best portion of Spanish wool, in different flocks of such sheep, as the finest sort in one may be nearly worth as much more as that of it in another. The two other sorts are a great deal lower than the first or best sort; but, from the above circumstance, they may be of more value, in some cases, than the best kind in other piles; they are, however, in no case, ever blended together by the traders in them, as they are suitable and applicable to different sorts of fabrics.

In the mode of sorting wool in this country, there will often, in a single fleece, be from eight to ten different kinds; and where the best sort of one fleece is not equal to the finest kind, it is put aside to a second, third, fourth, or a still inferior sort, which is of the same degree of fineness with it; but the best native short-woolled fleeces, as the fine Norfolk and South Down, are, in general, separated by the sorter into the kinds as below, which vary from each other in the degree of fineness:

Prime, or best of all.	Seconds, or next to fine,
Choice, or next to it,	Fine abb., or fine wool,
Super., or very fine,	Coarse abb., or more coarse,
Head, or chief good,	Livery, or still more inferior sort,
Downrights, or fair.	Short coarse, or breech wool.

There are some other names taken from these, and indicating a relation to their qualities, as,

Better livery,	Best abb.,
Small abb.,	Second abb., &c.

But, in addition to these kinds of clothing *white* wool, two, and usually, three sorts of *gray* are formed, comprising locks that may be black, or blended with gray hairs. In some cases, too, the sorter throws out any such particularly fine locks as may be met with in the *prime*, and makes a small portion of a very superior kind, which is termed *picklock*.

In each sort of wool, the relative value is greatly various, as there may be more demand for coarse, fine, or middle cloths, which has lately been very much increased by particular temporary causes; but before that, when the best Spanish wool, of good pile, sold at from five shillings and sixpence to six shillings the pound, the prime from Herefordshire fleeces

fetched about three shillings and sixpence, and that from the Norfolk and South Down, from three shillings to three and twopence the pound; the greater price of the Herefordshire being partly on account of its being in a cleaner condition. The Spanish wool is cleaner, too, than any of the wools of this country, as it is scoured after it is shorn; but that of the latter is but imperfectly washed on the backs of the sheep, before it is shorn. In a pack of the short-clothing wool of this country, of the weight of 240 pounds, in its state for the market, the waste will be about seventy pounds in the manufacturing operations; while the same amount of that of the Spanish kind, as sent to the market, will not have a waste, on the average, of more than forty-eight pounds. This is a circumstance which tends to increase the difference between the prices of each sort, equally with greater fineness in the latter kind.

There is much variation practised in the modes of sorting the same descriptions of fleeces, by different sorters of wool; some dividing them into several more sorts than others; but the statement, as given below, may be considered and taken as the average value of each kind relatively, when the prime or best is worth about 3*s.* 2*d.* the pound, and at the same time may be useful in shewing the requisites necessary in calculating, in the fleece, the value of the fine wool of this country.

		s.	*d.*		*s.*	*d.*
Prime,	from	3	0	to	3	4
Choice,	——	2	4	—	2	8
Super.	——	2	0	—	2	2
Head,	——	1	8	—	1	10
Downrights	——	1	5	—	1	6
Seconds,	——	1	3	—	1	4
Fine abb.	——	1	0	—	1	1
Coarse abb.	——	0	9	—	0	10
Livery,	——	0	8	—	0	10
Short coarse	——	0	7	—	0	8

Coarse woollen goods having of late greatly increased in demand, the value of the inferior sorts are now much advanced beyond the prices just stated, being nearly as below, for the pound in the metropolis:

	s.	*d.*		*s.*	*d.*
Short coarse	1	4	Head	1	10
Livery	1	5	Super	2	0
Fine abb.	1	6	Choice	2	2
Seconds	1	7	Prime	2	6
Downrights	1	8	Picklock	3	0

In estimating the goodness, or qualities and value of wools, the filaments of the fine sort are so very minute, that it is requisite to have an eye which is accustomed by much experience, to fully adjust and determine the relative degree of fineness in two piles, which may differ very greatly in their value. Nay, even such persons as have been long habituated to the business, have often much difficulty in forming, at once, a just estimate of the degree of fineness of it, when but for a short time prevented from examining wool. It is, consequently, not extraordinary, that others who but seldom attend to it, should frequently be incapable of deciding upon its goodness. This being the case, it is obviously much to be wished, that some easy, ready, and conveniently exact instrumental mode of fixing and determining the point could be hit upon, so that the inquirer might, in all cases, be able to decide with certainty and correctness. But although different micrometers for the purpose have been invented and contrived, there are, probably, none which are perfectly exact, and in every way conveniently fit for practical use. They would all seem to give, in some measure, erroneous results. Thus some, it is stated, make our best native wool to measure the fourteen hundredth part of an inch, which is finer than the Spanish of the first quality, as

more accurately measured by others. And that a moderately fine sample of the Spanish sort is made by one to reach the sixteen hundredth part of an inch; while, by another, the very best of the same kind is not smaller than the fourteen hundredth part of an inch.

It is supposed, however, that the diameter of the fibres of the best wool of this country, as sorted in the usual manner, will be nearly correct as given below, deducting one-fifth:

Sorts.	Parts of an Inch.
Prime	$\frac{1}{1120}$
Choice	$\frac{1}{1024}$
Super	$\frac{1}{928}$
Head	$\frac{1}{800}$
Downright	$\frac{1}{740}$
Seconds	$\frac{1}{640}$
Abb.	$\frac{1}{680}$
Fine livery (variable)	$\frac{1}{480}$

In sorting the hosiery, or short combing wool, a varied length of the staple is requisite, as the fineness of it may be; as for the better kinds, it should not be less than from four to five inches, but the inferior sorts may have a range to the height of eight inches; while any increase of that length is not beneficial in any sort of soft worsted. Hosiery wool requires the same soundness and fineness of staple as the long combing sort, but fineness of the hair and softness are more material. The fleeces which afford the fine combing wool, give almost the same amount of the short kind, which is employed in much the same manner as the commonly-used clothing kinds.

In general, the combing sorts for hosiery articles are termed,

Super matching,	Altered drawing,
Fine matching,	Brown drawing,
Fine drawing,	Saycast.

Which are terms most probably derived from the former practices of the manufacture that are now lost. The last sort, it is supposed, was most likely primarily the long coarse wool of the combing kind, thrown out for the fabrication of says. Of these sorts, the relative value, in comparison with each other, varies in proportion to the demand for the finer or coarser sorts of hosiery goods, and the clothing trade has some effect on it. In cases where any clothing kind, that ranges in fineness with some one of the combing, is in high demand, the wool-sorter will break down the shorter combing wool of this sort, it is said, and put it to the clothing wool, which renders the price of the former higher, by increasing the scarcity. Out of the best combing wools, the fineness of these sorts will be nearly as below, in the fractional parts of an inch, when stated in numbers, as compared with the clothing kinds:

Super matching	$\frac{1}{810}$	Altered drawing	$\frac{1}{600}$
Fine matching	$\frac{1}{780}$	Brown drawing	$\frac{1}{580}$
Fine drawing	$\frac{1}{700}$	Say cast	$\frac{1}{450}$

The best wool sorters, in common, put aside the hog combing wool from the best sorts, so as to make a superfine hog kind, for the bombazine manufacture; this sort being less proper for hosiery articles, as not requiring to be so finely spun as that for hard yarn. It is not unusual for all the several sorts of short combing wool, as well as many kinds of clothing wool, often to take place in the same native fleece; but the greater the proportion of the fine sorts and the better for the sheep-farmer, provided the weight be not too much diminished.

CARDING, OR CLOTHING WOOL.

The principal qualities which are requisite in this sort of wool, are a shortness of pile, and a disposition, in the fibres of the hair, to be put in a crumpled, shrivelling or spring-like form; a disposition which has not been

found capable of being communicated to wool, where it does not originally exist.

The short or clothing wool, may have a variety in its length of staple, from one to three inches, or more; as when longer, it is necessary to be cut, and reduced preparatory to the more extended use of it, in the manufacture of cloth, which is expensive. This sort of wool, is constantly carded, broken, and separated in its parts, by a contrivance which has very fine short ivory teeth, which open, divide and spread out the fibres of it in all directions; the articles made from it, undergoing the process of the felting mill, by means of which the fibres become more forced together, close and compact, and the quality of the cloth in its texture, greatly improved. In the qualities of this sort of wool, of coarse shortness of the pile, and an inclination to take on the contracted or corrugated form, are of much consequence; some, who are engaged in the making of cloth, suppose, that such wool as is used for cloths of the finest kinds of texture, can hardly be of too great shortness, provided it has that high disposition to corrugate, or become crumpled, which is necessary for its forming what is termed in the art, *a roveling*. This quality can hardly exist in a too high state, where any kind of articles are to be made from it, in which a closeness and smoothness of surface are required; as the greater and more minute the extent of the very small curves, or contractions are in any determinate length of the pile, it is capable of being so much the more broken and reduced, without being hurt, and each of the parts holds an ample state of crookedness to hitch in with its next portion, so as to constitute an extremely fine, thin and exquisite texture of the fabric. As a very considerable portion of the clothing wool that is grown in this country, is of too great a length for the card to act properly upon; the first operation which it undergoes in all such cases, after the stapler has done with it, is that of being shortened in the necessary degree.

COMBING, OR LONG WOOL.

In respect to this sort of wool, it is highly necessary that it possesses a sufficient length, as well as a degree of curvature, or disposition to contract the length of pile, though this property should not too much prevail. The length of pile suited to this purpose, is usually more than five inches, and some uses, as those of the hose trade, require it from four, to eight inches in length.

In the case of long or combing wool, it is therefore requisite that there be a proper length for different purposes, which may be various, from three to eight inches or more. It should likewise have a very slight degree of the curving quality, or disposition for shortening the length of the pile, as where it is wholly wanting of it, the *sliver* cannot be so well formed by the workman; but this property should only exist in a very small state. This sort of wool is prepared by a comb, or contrivance, which has rows of long teeth of steel, that separate the fibres, and place them in a longitudinal manner; and in the thread that is spun from such wool, the fibrous or filamentous parts of it are put in a somewhat similar manner, to those of the flax kind; and the portions of the goods, when formed by the workmen, do not undergo the operation of the felting mill. In the operation of forming a long woolled or worsted thread, as every hairy fibrous part has been first placed by the side of the others, in a regular manner, the pile is drawn out in spinning, in its longitudinal direction, each individual hair, lying in a parallel manner to

the whole of the others which are near to it, is wound and twisted somewhat spirally. Consequently, were these hairy fibres to have the quality of contracting their length in too great an extent, they would not have that exact arrangement for being drawn out in that regular manner which is necessary in the operation, but be formed into the thread in an unduely corrugated manner, which may be hurtful to the produce in yarn, as well as the articles which are manufactured from it. The shorter wool of this sort, is for the most part applied to the purpose of hose, being spun in a more loose and soft manner than that of those which are of more length, the first kind being formed into what is termed *hard* worsted yarns, and the last into *soft* yarns of the same kind. The different lengths of the pile in this sort of wool are suitable for different uses; but that of about four inches, is perhaps, the most generally applicable for the purpose of the comb. A great part of that which has the length of, from that of the above, to eight inches and upwards, is suited to the uses of the hose manufacturer; and that of still more length, is mostly employed in the forming of worsted yarns, in the fabrication of which there is much variety. The more short stapled sorts, of this kind of wool, is applied to the forming of most kinds of woollen goods; and a pretty large portion of that which has the growth of the pile, to the length which is proper for the comb, especially, that which is possessed of the corrugating and felting properties too greatly, or is too weak to stand the action of that tool, or is converted to the forming of such woollen articles, as require a long and fully raised nap upon the surface.

In the staple of this kind of wool, there is another quality, which is that of readily yielding, and giving way in the manufacture or pliability; as it is greatly valued as a highly necessary property, and one which should, consequently, be well regarded in the growth of the material.

A suitable state of toughness, too, in the pile, is of much value in such wool, as is plain from the effect which the carding instrument is designed to have upon it; and those who raise it may readily discover when such wool has too much weakness, by the staple breaking, when drawn rather forcibly in different directions by the hands, as it is then not suitable for the making of worsted goods. Great care has, of course, been said to be requisite, in endeavouring to render the pile better, and more fine, by having recourse to the selection of such males as bear a smaller fleece, as there are but few breeds or sorts, in the whole island, that afford fleeces at once, fine, and of sufficient strength, for the combing process. And it has been a matter of complaint by some, that by the bettering of the sheep in several of the midland districts, where such wool is much grown, the qualities of the staple have been greatly hurt; and the wool made too weak for the ancient established manufactures, of the woollen kinds. But it is supposed that this is an evil that cannot but soon rectify itself, as "deep strong wool, will become the most valuable."

In the above, or carding kinds of wool, however, the contrary of this is the case, as they should not have too great a state of strength, or be over tough, in consequence of the first operation which they undergo, being to break and reduce them into small parts. And when there is too much tenderness in them, they are not unfrequently liable to be broken and reduced too greatly, for the nature of the staple in undergoing the action of the machine, through which they pass; and be thereby

caused to have much waste, produced by the revolving power of it. Besides, the cloth which is made from such wool, as has not a proper degree of toughness, is not capable of sustaining the severe action of the fulling process. The nature of this wool, which has the felting property, has been already in some measure spoken of, and explained, but is only capable of being fully ascertained by the actual trial, as there is nothing either in the feel or the appearance that tends to shew when it is present. It is a quality, however, which is not wanted in goods of the worsted kinds, such as baize, flannels, hose, or other sorts that do not stand in need of the process of fulling.

But notwithstanding this, it is an excellent quality and perfection in wool, for many purposes, as those of cloth, hats, and some others; and it is not improbable but that there are some sheep of most breeds, and sorts that afford wool of this kind, although there may be others in the same stock, and under the same keep, which do not yield it. The sorts of sheep which are the most remarkable for this property in their wool, are perhaps those of the Norfolk, the Shropshire or Morf, and the Chiviot, but some others possess it in a moderate degree; and there are still other kinds of fine woolled native sheep, that have much the same appearance of the fleece, but mostly without having much of the property. It is a property which does not seem to be particular to any certain kind of hairy coat, as those of many differently haired animals possess it in a very considerable degree. The kempy hair which is so frequently found about the breech, and some other parts of sheep, has usually a sort of white silvery brightness in the colour, but occasionally a brownish or grayish cast, is commonly so united and intermixed with the wool of the fleece, as to be incapable of separation, and thereby to be greatly hurtful in different ways, as not properly taking the tints in dyeing, but from the more active matters that are made use of in such cases, and by spoiling the goods in which it may chance to be intermixed and blended, by giving a hardness and coarseness to the fibres, as well as by its pointed sharpness and stiffness.

The short wool of the South Down sheep, is chiefly employed for the purpose of making fine cloth of the light goods kind; but the long wool of the Lincoln sheep is mostly converted to the forming, in the finer portions, such articles as tammies, calamancoes, shalloons, and others of that kind; and in the more coarse picked out parts, the making of blankets, coarse cloths, carpets, and such like rough goods. These last sort of sheep are said to afford the best perfect kind of combing wool; but that those of the Leicestershire sort, have a more fine state of the fleece, yet have the necessity for remaining a longer time in the tops; and in many cases are faulty in the back parts, from which there is great loss, by carding, and which causes them to be used for the very inferior kinds of articles. In all cases wool should, consequently, have an equality, or evenness of top, having the substance of it in an uniform state, from the skin to the outer end, not having any thing of what is termed *tag*, or roughness of the hairs on the outer part of the coat. Those fleeces which are the most substantial in proportion to their weight, are the most valued; such as are wound up in small portions, in relation to it, not being much liked by those who have the manufacturing of them.

SKIN OR PELT WOOL.

In regard to skin or pelt wool, which is separated from those of slaughtered sheep by the

fellmonger, it is too short for working by itself soon after shearing, and is, therefore, commonly kept and used, mixed in with the wools of greater length. The means by which wool is made to separate from the pelts of the sheep, is supposed to have a tendency to render it hard, and to injure or destroy the felting or milling property of it; in consequence of which short skin wools are rarely made use of for the making of cloth, but more commonly for flannels, serges, and those sorts of articles which stand in need of but little or no milling at all. The first or best kinds are in considerable use for hose, formed of yarn from clothing wool. But in the spring season, when the wool on the skins has gained much length, it is put by into combing sorts, the more fine kinds are employed for yarn hosiery of the knitting sort, and that which is more coarse for hard yarn for the warps of serges, and other such articles, which have a warp of combed wool, and a weft of the carded sort. Skin wool is scarcely ever of the same value with that of the fleece kind, which is the same in length and fineness, in consequence of the felting quality being hurt, which causes it to be less fit for the making of woollens of the cloth kind. The quantity of this sort of wool, in consequence of the vast consumption of food of the mutton kind, is very great, being supposed to amount annually to near 50,000 packs, of 240 pounds each, for the English and Welch pats of the kingdom.

LAMBS' WOOL.

This is a kind of wool which, except in particular circumstances, is found to be softer in the quality than that of the sheep's kind from the same sort of flocks. It has the property of crumpling or felting in a very high degree, on which account it is chiefly manufactured, and wrought into hats and such like goods, with the exception of the skin wool of this sort, which, in a great measure, having lost its felting quality, is made use of in the manufacturing of flannels, and yarn for hosiery of the lambs' wool kind.

The lambs of some particular breeds of sheep, in some parts of the north of Europe, have, as has been seen, a fleece so fine and delicately soft in its nature, that it forms an extremely fine fur of great value, having its preparation on the skin, and being made use of as an article of dress of great richness and cost.

It is, however, an extraordinary circumstance, that in many of the flocks of the Merino kind, the wool of the lambs is coarser than that of the old sheep. In some of the flocks of this sort, indeed, the lambs are, in the first instance, coated over with a sort of coarse hairy covering, which, at an after-period, is shed, and they then produce wool of the finest kind.

These are the main qualities which the different kinds of wool should possess for most uses; but there are many other particular properties which are necessary in each sort, as will be seen under their proper heads below, as smell, pelting property, trueness of hair, colour, softness, &c., each of which are particularly described.

SOFTNESS.

The first of these properties, or that of softness, has been already seen not to be caused by the nature or fineness of the fibre of which it is composed, but to arise and depend on the peculiar silkiness of the feel which it affords; as there is much difference in the states of this property of the different wools of this, as well as of other countries, where the fibres of them

are equally fine ; but the value of those which possess the former quality, is far the greatest for a great many uses. The nature and causes of this difference have but lately been fully discovered and determined ; but besides the kind of food and the kind of sheep, it seems to depend much on the quality of the soil, and the greater or less exposure to light and heat to which the animals are subjected, as where there is a freeness from calcareous matters, and more earthy stiffness in the lands, and less intenseness in the light and heat, the wool produced has more softness in its quality, and is greatly superior in its nature in different intentions of the manufacturer. The properties of the yolky or greasy material, may likewise contribute in some degree to increase the softness of the wool.

FELTING PROPERTY.

The second, or the felting, property of wool, is closely conjoined with the softness of its quality, as hard wools are constantly deficient in this quality. This is a property which is materially necessary to the strength and beauty of cloth of the woollen kind, and which gives more readiness in the manufacture of it, as well as a more close pile on its surface; in consequence of which, it is not uncommon, to blend a portion of soft wool with the hard sort, in order to afford a greater facility to the felting in such cases.

SOUNDNESS OR TRUENESS OF THE HAIR OR STAPLE.

The third quality, or that of the soundness or trueness of the hair or staple, is not so material in wools of the clothing as in those of the long or combing kinds; but for some sorts of colours, which are hurtful to the wool, it is highly useful that the fibre should be perfectly sound, and of sufficient strength, which have their dependence, at first, in a great measure, on the animal being in an healthy state, and on there having been a sufficiently full supply of keep afforded it. The fleece, on some of its parts, will have the staple, for the most part, more tender, and less *true grown*, on some portions than others ; but these, by being suitably mixed, have the tendency to constitute a close pile on the surface of the cloth, which is formed from them.

COLOUR.

In respect to colour, the wool of the fleece should in all cases, come as near, as may be, to that of a perfect white, as being not only essential for all cloths that are to be dressed white; but for all such as are to be dyed of bright colour, where a clear white ground becomes requisite for affording a proper state of lustre and richness. It is not improbable, but that the wool of most sheep was originally of a black or reddish brown cast, as coloured wool is most likely to have had a preference to white before the invention of dyeing was discovered ; but after the means of giving fine colours to such materials, white wool would, of course, be more in demand, and such sheep as were white in the fleece, be chosen for propagating the breed. This is rendered extremely probable by all the most ancient accounts which have been given of this wool-bearing animal. Coloured wool being less valuable than such as is white, as in many sorts of sheep there is a tendency to the growth of gray wool on some parts of them, or to give some gray fibres in mixture with the wool of the fleeces, which unfits it for different sorts of white fabrics ; as though the coloured hairs may be so few, or so minute in their size, as not to be discovered by the

sorter of the wool; yet, when the article, in its preparation, is stoved, they become quite visible, producing spots of the reddish or rusty kind, which are greatly injurious to the appearance of it. Some white-faced, fine woolled, native sheep of this country, afford a fleece, which is entirely without being blended with hairs of the black or gray cast. And in those sheep-stocks, where the gray intermixture is the most evident and prevailing, it is a fault and defect which may be overcome in a gradual manner, and which is, especially, to be desired in those fine woolled sheep, that are kept in some districts, where the ground is of the calcareous kind; as the wool raised on such sorts of land, although inferior in softness to those on other sorts of soil, is, in common, more white and more proper for such fabrics as stand in need of the operation of stoving and bleaching, and which do not demand so much fulling as many other kinds.

CLEANNESS.

This is chiefly considered by the wool buyer, as it influences the weight, and, from the statement given below, is evidently a matter of much interest to such purchasers. In common, such fleeces are the most advantageous to the wool grower, as are well imbued with the greasy material or yolk, as it preserves the wool in a properly sound condition and increases its softness; but still it should be washed away as much as may be, previously to its being offered for sale. This greasy substance in the fleece seems, from the trials that have been made, to be a sort of soap, and to be the most largely afforded in such kinds of sheep as produce the most fine and soft wool, being constantly the most prevalent on such parts of them as give the finest portions of the wool. This soapy substance, however, notwithstanding its being so useful to the wool in the state of its growth, becomes prejudicial to it when clipped from the sheep; as, when the fleeces are suffered to continue piled up in an uncleaned state, a fermentation is taken on, the greasy material gets hardened, and the fibres of the wool are made hard and brittle; effects which happen the more readily, the more hot the weather. In the Spanish wool, this substance is there, for the most part, got quit of by washing, after it has been shorn and sorted; but in other countries the methods pursued are different. The tabular statement, as below, is given by the writer "On the influence of soil and climate on wool," as containing the amount of neat wool in every hundred pounds' weight, on the average of each sort; and taking each as free from the pitch lumps used in marking, and cleared from the *dag-locks*; the different columns shewing the average weight, after the wool has been rendered perfectly clean, by scouring with soap and water, and is become dry, and the quantity of waste.

Sorts.	Quantity.	Pure Wool.	Waste.
English Wool, washed on the sheep's back	100lbs.	75lbs.	25lbs.
Saxony Fleece Wool . . .	—	80	20
Spanish R, or refine . . .	—	88	12
Spanish and Portugal, unwashed	—	75	55
English Fleeces, unwashed .	—	60	40
Northumberland lightly greased wools, washed on the sheep's back . .	—	65	35

In the sheep of the mixed and other Merino sort, in this country, in consequence of the difficulty of washing, the wool on their backs has mostly been shorn in the unwashed state, and so offered for sale; the buyers, from being often not fully aware of the loss it would sustain by being washed, have become dissatisfied at the circumstance, which is conceived to have been a matter that has tended more to prejudice the manufacturer against English Merino

wool, than any other. Besides, the wool suffers injury by continuing in the grease; and it has been asserted, by those engaged in the manufacturing of fine cloth, that the best Spanish wool, which has been almost wholly cleared of the yolk, still holds sufficient to injure the wool, if it be permitted to become old, when it is packed, as getting rancid and hard, and imparting the latter quality to the wool. And the same has been noticed to be the case with fine wool, of this sort, from other parts. When wool has been cleaned by washing in the manner usually practised here, and become packed or piled up, in the course of eight or nine weeks, a certain process takes place, which is termed

SWEATING,

Which is a circumstance well know to the dealers and manufacturers in wool, but unnoticed by most others, being evidently the beginning fermentation of the yolk or greasy matter that remains in it, and which gives a sensible warmth to the inner part of the pack or pile. By this means a certain change is produced in the wool, by which it becomes in a better state for being wrought, becoming, in the northern language of the art, less *fuzzy*, an effect which is the consequence of the natural elasticity of the fibre being diminished. When this sort of fermentation happens in unwashed wool, it proceeds farther, so as to injure the colour and soundness of the staple or fibre of it. The same sort of effects take place in oiled wool or cloth that contiuues for some time in an uncleaned condition, and sometimes a state of combustion is taken on, in consequence of masses of refuse wool continuing in a greasy condition, and are productive of very serious mischiefs in concerns of the woollen kind.

WEIGHT.

This is material to both the wool-grower and dealer, as the augmentation of it does not wholly imply its being more coarse in its nature; and the difference in the relative weight of different wools is probably too inconsiderable to be deserving of the notice of either the grower or the manufacturer of the article.

SMELL.

This should be sweet, and wholly free from any sort of noxious taint, as being the most suitable and pleasant for all sorts of manufactured articles.

In describing the fleeces of this country, an able writer, according to the wool-staplers' mode, has arranged them in different classes as above, which are distinguished from each other both by the length of the staple and the mode of manufacturing them, as being adapted to the fabrication of woollen goods and to that of worsteds. "The sheep from which these different kinds of staple are obtained, do not always run promiscuously in the same flock, or graze upon the same pastures; each being most commonly found upon its appropriate soil, and under a peculiar management. Sometimes the line which separates them is boldly drawn; at others, the pastures are so mingled, or the qualities of the land so gradually change from those which are suitable to the heavier sheep, as to give the stock a sort of mongrel appearance, and the fleece an uncertain character. But human genius, always fertile in expedients, has rendered even this defect of the fleece advantageous to the interests of society, and has adapted it to the manufacture of stockings. Long wool is found in many detached parts of England, but much more commonly on the eastern than western side, and often nearer to the coast than the

middle of the kingdom. Among the larger ranges of long-woolled sheep, the first to be noticed, and the most northern, is situated near the mouth of the Tees, a river separating the bishopric of Durham from the county of York. The second, which may properly be denominated the Lincoln district, comprehends the south-eastern point of Yorkshire, nearly the whole of Lincolnshire, and the fen lands of Huntingdon, Cambridge, and Norfolk. This kind of wool is also found in the smaller marshes of Essex and of Kent, which surround the inlets of the sea, but is much more abundant in those of Romney and of Guildford. We meet with it in the counties of Dorset, Devon, and Cornwall, upon the Cotswold hills, in some detached parts of Lancashire, Oxford, Bedford, and Stafford, through the whole of Leicester, Rutland, Northampton, and Huntingdon, and along the banks of the larger rivers."

This has been more fully and particularly seen in what has been said above of the several kinds of such woolled sheep.

It is stated, however, that " the short wools of the kingdom do not arrange themselves so distinctly in districts, as those of the longer staples do, but fill up the whole space besides that which has been noticed as the pasture of the heavier breeds of sheep. Those families which produce a fleece suitable to the card, though originally possessing features much more strongly characteristic than are found in the other kind, are sometimes so mingled with each other, and with the sheep of the larger fleece, as to render it difficult to determine what particular race many of the individuals belong to. Yet it is convenient to describe them in classes, and to proceed from that county to where the species appears most pure, to those where its blood becomes intimately mingled with that of another variety. Though the period when any of these sheep were introduced into the country is not known, nor whence they were procured, there remain at present, in England and Wales, six different kinds, namely, the Norfolk, the South Down, the Wiltshire, the Ryeland, the heath sheep, and the mountaineer; besides some small collections of different varieties which seem to have descended from families now almost extinct."

WOOL MARKETS.

In the districts which produce these different kinds and qualities of wool, as seen above, much variety is found in the nature of the sheep as well as in the wool which they produce; and an equal diversity exists in regard to the methods or customs of disposing of it. It is stated, by the above writer, " that in a small portion of Staffordshire, it is common to sell wool by the tod of thirty pounds; while in almost every other part of the Leicester and Lincoln districts, which has been noticed, the tod of twenty-eight pounds is used: and in order to accommodate the seller, a pair of seven pounds weights is conveyed by the stapler to the place where the wool is to be weighed. They are usually cast in a flat form, with the arms of His Majesty upon them, and adjusted by the tower standard. For the convenience of carrying them on horseback, they are united by a thong of leather, which sometimes weighs from five to sixteen ounces. This some farmers allow to be balanced with the weights in order to make up the tod, and actually produce a weight for their wool, which varies from twenty-eight pounds ten ounces to thirty pounds. The practice of using the strap, and of balancing it, is commonly defended, upon the ground of old Acts of Parliament, which are said to allow

such extra weight, as a counterpoise to the moisture, and the dirt which the fleeces contain; but at present, it is believed, it rests entirely upon custom, being sanctioned by no law whatsoever. When the practice of using Tower weights was first adopted, the design, it is supposed, was an admirable one; for it prevented those endless squabbles which must have constantly arisen when the farmer sold his wool by *handsell*, a practice now entirely laid aside in Britain. But instead of promoting justice, it has sometimes been made the means of fraud; for, unless a specific bargain was made for the weight of the tod as well as for the price of the wool, the quantity sold for a given sum of money was only nominal, and was to be determined by the conscience or the policy of the buyer. In many cases, the increase of the tod to thirty pounds, did not more than compensate for the trash which was often found in the fleece; the manner of winding wool was shamefully unjust, for the bundles contained, besides dirt of different kinds, a quantity of *dag-locks* of wool from dead sheep, and that which had been shorn before the staple had attained its full length, of which the ancient technical terms are now almost forgotten, even among the staplers themselves. False winding, or the enwrapping any wool or other substance in a fleece, which does not naturally belong to it, is still cognizable by the law, and punishable with a very heavy fine, to be recovered by an easy process. But farmers, at least the enlightened part of them, are guided in their commercial transactions by better principles than penal statutes afford, and the dishonest ones are soon known sufficiently to prevent any disadvantage accruing to them from practices which bring the whole body into disrepute among persons who indulge in general censure when irritated by the crimes of individuals. Buyers of wool, it is considered, would consult their own interest if they laid aside all local customs, and weighed wool from the farmers upon the same broad principles that are adopted among themselves. Indeed, farmers are now so much better acquainted with the principles of commerce than they were formerly, as to see the advantages resulting from an universal weight, as well as regulated measure, and from exchanging local customs for more general measures; and the writer is acquainted with wool-staplers, who rejoice when their weights, the badges and the tests of honesty, are found to be useless."

This writer has further observed, too, " that in the district, which in some measure may be denominated that of the Norfolk sheep, wool is often sold by the pound; in some parts of it by the tod of twenty-eight pounds, and in others of twenty-nine pounds; but there seems through the whole a disposition to lay aside local customs, and to adopt those of a more general nature. The use of the strap is not always dispensed with; but many farmers complain of it, and are disposed to adopt a new method of weighing their wool, one which is calculated to destroy all ambiguity in the tod, which they may make use of." This should certainly be every where the case, and the most liberal principles be exercised in the trade.

In speaking of the practice of Herefordshire, with respect to wool, this writer on it has asserted, " that no other part of the country takes so much pains to render its fleece marketable as this. Here, the old custom of employing sworn winders is diligently adhered to, and they are engaged to strip off the coarse part of the fleece, and to wind up only the better kind of wool, to tie about half a dozen

fleeces together, and to ticket the weight of each bundle, or, as it is there called, trendle. In this county, the bundle does not resemble that of Norfolk, as sometimes supposed, for in Herefordshire the fleeces are wrapped up separately, very hard, and commonly in the shape of a nine-pin, and of these the bundle is composed; but in Norfolk the unwound fleeces are spread upon each other; and when a sufficient number are thus disposed, all of them are rolled up in one general mass, and then also called a bundle. This latter is, certainly, the easiest and quickest mode of securing the fleeces, but it obliges the farmer to conceal the best of his wool, and the buyer to purchase it rather from recollection of the sorts which the parcel produced in former years, than from any opinion formed of the value of those particular fleeces which are offered to his notice. The parcel of a certain person, he knows, was last year either good or bad, and he supposes its quality will not be greatly altered in this. But where every fleece is wrapped up singly, there is evidently much more room for the exercise of skill in estimating the value of a quantity of wool, and a more solid basis whereon to found a definite opinion. In Herefordshire, fleeces are sold in public fairs, by a stone of twelve pounds and a half."

These form the most material customs which have been in use respecting the disposal of wool; but there is a want of much nice, practical, discriminating regulation, so as not only to render the knowledge of the various qualities and properties of it more generally certain and exact, but likewise more equally just and beneficial to the buyer as well as the seller, as the nature, circumstances, and demand for it may be, when offered for sale in the fair or market. All sorts of jobbing and privately meeting for arranging and fixing the prices of the article, without its being seen and examined, should be wholly discarded and rejected, as highly injurious and improper, and in this way a proper competition be promoted and encouraged in the best and most certain manner in those who buy, as being thereby enabled to judge and form their opinions and decisions in the most useful and perfect manner; and the whole business of the sale be thus at once completed on the spot, and little time be lost by the different parties who are interested. The markets or fairs, where the article is exposed and sold, should always be open and public, that no sort of suspicion of unfairness in any way may be excited. A judicious and excellent writer on "The Nature and Properties of Wool," has well observed, in confirmation of what has been just said, that "he is the friend of public markets, of open, honest, and candid transactions of institutions, which give to all an equal chance, and of those which are calculated to secure for an excellent and useful article, its just and adequate price, and to deprive an inferior or less useful one of its fictitious value." That "the benefits arising from public and open markets," are too plainly evident in some northern districts for it to be in the least apprehended, "that if generally instituted for the sale of wool, they would injure the interest of the stapler." But that, "if they are instituted, they should be markets, meetings where something is to be seen, as well as done or purchased, and not a mere name, an unsubstantial something, in which the buyer has no interest. Then, and not till then, it is apprehended, the wool-grower will have no reason to complain that staplers do not attend, that they appear to dislike these fairs or markets."

Consequently, some proper law and autho-

rity seems necessary and wanting, to appoint such markets and fairs, where requisite, as well as that of suitably honest, upright, and sufficiently-experienced persons for seeing and making the examinations of the different clips of the vicinities of them, and for regulating every thing that may be needful for the fair and equitable sale of the wool that may be there produced and seen. Some such regulation respecting the disposal of the article, in all such cases, would effectually prevent all sorts of little narrow jealousies, suspicions, and disputes on the subject, and bring the grower of the wool the just and fair price in proportion to its nature and quality.

QUANTITY OF WOOL PRODUCED.

The grand total of wool produced in England and Wales from the larger and smaller sorts of sheep, collected when living, and from their pelts when dead, and from lambs under a year old, amounts to more than 393,000 packs; and this is procured from more than twenty-six millions of wool-bearing quadrupeds, and from thirty-two millions, three hundred and fifty two thousand acres of ground.

Notwithstanding, however, the English fleece appears susceptible of further improvement, with respect both to long and short wool; as the spirit of improvement has gone *abroad*, no doubt in the course of a little time, we shall experience its good effects *at home*. About 30,000 packs of wool were imported into this country in 1817; and such have been the exertions of the celebrated agriculturist, John Macarthur, Esq., in New Holland, that his flocks had increased that year to about 7000; and the wool, sent to England, at different times, is become an important source of profit, the better sort being equal to the best Merino piles from Spain or Saxony, or perhaps more nearly resembling the latter, and if both were equally clean, the most discriminating and experienced eye, could not probably perceive any difference whatever between them, either in the fineness of the hairy fibre, the length of the staple, the soundness of it, the colour, or in any other properties it may possess. It consequently cannot but be highly interesting, to find that as so much more of the best kinds of wool are wanted for our manufactures than that which we produce and possess, that such an extensive track of the colonized territory belonging to this country, as that above, has been provided with sheep of the finest woolled kind, and a large and valuable produce of such wool afforded, where, before, scarcely any thing useful for man, in the sociable state, had ever been raised.

SECTION XVI.—*The Improved Means of Working Wool now principally in Use.*

THE various kinds of machinery by which wool is prepared and manufactured into different sorts of fabrics and articles of trade, have, within these late years, undergone considerable alteration and improvement, but we can here only give a very concise account of them; the new Cyclopædia of Dr. Rees, has, however, under different heads in relation to wool, fully considered and explained the nature and operation of them as they regard the different kinds, and the several processes which they are to perform. It is stated that, from the most remote period of the woollen manufacture, until the latter end of the 17th century, or about the year 1780, very few, if any, mechanical improvements had been introduced into it. During the whole time the various processes were carried on in the same manner, but with greater

or less skill, and were employed upon materials more or less valuable. The carding and spinning of wool, and the weaving and finishing of cloth, in the early part of the reign of George III., were effected by the same machines as in the time of Edward III., which probably were similar to those of the ancient Romans, but more rude in their construction. In an art which had seen so many centuries roll on without any change, it did not appear possible to the manufacturer that any improvement could be effected; and had not the genius of Hargreaves and Arkwright changed entirely the mode of carding and spinning cotton, the woollen manufacture would probably have remained at this day what it was in the earliest ages of civilized society.

The origin of the spinning jenny, which was the same as that employed in the cotton manufacture, but somewhat larger, was introduced into Yorkshire from Lancashire about the year 1780, but did not become general till about three years afterwards. In the first jennies not more than eighteen or twenty threads could be spun, and the mode of winding the thread upon the spindle was very imperfect. The carding was still effected by the hand, and the slubbing or roving was prepared on the common spinning wheel. Considerable difficulty was, for some time, experienced in carding by machinery, particularly in clearing the wool from the card, and a slight change in the construction of the machine, was found necessary, to prepare the wool for the slubbing-Billy. Soon after this the carding and spinning of wool and yarn by machinery, became general through the manufacturing districts of the West Riding of Yorkshire; and large mills were erected, in which the carding and scribbling machines were turned by a water-wheel, and the roving or slubbing performed on the Billy. The wool carded at these mills was sent to the smaller manufacturers in the state of slubbing, and the farther process of spinning was effected on jennies in their own premises. Before the year 1787, the old processes of carding by the hand, and spinning on the wheel, were entirely discontinued in Yorkshire; but it was some years after before the new processes were generally introduced in the west of England; and thus the woollen trade became more concentrated in Yorkshire, where clothes could be manufactured at less expense.

About this time machinery began to be applied to the combing and spinning of long combing wool, to make worsted yarn.

Owing to the great increase of trade in Yorkshire, and its being found difficult to obtain situations for mills to be turned by water, and the application of the steam-engine to woollen machinery became very general. The abundance of fuel in the district being highly advantageous to the Yorkshire manufacturer, and it being found to be equally cheap to work the machines by steam as by water, when any considerable rent was payable for the water. The motion of the improved steam-engine was rendered as regular as a water wheel, and the great inconvenience and loss from the interception of the work by frosts or continued droughts were thereby avoided.

At first, the smaller manufacturers in Yorkshire were considerably benefited by the introduction of machinery; but in a little time, large capitalists began to engage in the woollen trade, and performing all the processes with their own machinery, they were enabled to work cheaper and undersel the smaller makers. The facility, also, with which wool could now be worked up, kept the markets always well stocked with goods, and prevented the manufacturers from taking the advantage of a temporary scarcity or a brisk demand, which they had formerly

done, an overstocked market always reducing the profits. Soon after the year 1800, the number of small manufacturers, however, began rapidly to decrease, many of them being ruined by the change which had taken place, and were compelled to become workmen in the factories of the large capitalists.

THE WOOL MILL OR WILLY.

This is the first machine that is employed on the raw wool, to open and disentangle the close matting, in which the wool comes from the wool stapler. It is used, too, for clearing the dyed wool from the dyeing matters, and for mixing different parcels of wool together, as well as for incorporating the oil, which is used, with that article.

The wool employed for coarse articles, is put several times through the wool-mill; first, to break the mats of the raw wool, and render it light; then, again, after it is dyed; another time to blend the different sort together; and lastly, after the oil is applied to the wool, to unite it well with the fibres of it.

THE SCRIBBLING MACHINE.

In this which is used for the first stage of carding, the operation tends to disentangle the fibres which were before closely entangled, and draw them out separately, so as to render the wool light and flaky. This is an operation which is repeated or undergone two or three times; when the wool has another performed on it, that of carding, which is much the same as scribbling, only differing in having the wool formed into small cylindrical rolls, which are the first materials of a thread. This machine is very similar to

THE CARDING MACHINE,

Which has a large cylinder or drum, that is covered on the surface with sheets of leather, stuck full of projecting wire teeth, called card-wires. The teeth are so close together as to cover the whole surface of the cylinder like the bristles of a brush. This cylinder is turned rapidly round by the machinery, and the wool is regularly and slowly supplied by feeding contrivances and machinery to its teeth, which take it up; and the cylinder, as it were, clothes itself with wool. This wool is carded or worked by the teeth of several other smaller cylinders, called workers and clearers, which are fixed around the great cylinder in pairs. The teeth of the workers take the wool from the great cylinder and give it to the cleaners, which return it again to the great cylinder, and it is transferred to another worker in like manner.

DOUBLE SCRIBBLERS.

The double scribblers are commonly employed in Yorkshire; that is, two of the machines combined together, and placed in one frame; there are two large cylinders, each surrounded with its workers and clearers, and a doffer, making in all seventeen small cylinders. The doffer is fourteen inches in diameter, covered with separate sheets of card wire, each about four inches wide, and moves round very slowly. The first great cylinder has a feeding cloth and carrier, to supply the wool to the cylinder; but the second large cylinder is supplied with wool from the doffer of the first cylinder, which doffer serves in place of a carrier to the second; it, therefore, has no comb. The doffer of the second cylinder has a comb to take off the wool which then falls into a basket. This machine is said to save the trouble of attendance, and does more work than two simple machines.

The cardings which are the production of the joined operations of scribbling and carding are constituted of the fibres of wool placed

very lightly together, the least possibly entangled, being made very regular and even in size, as upon that principally depends the perfection of spinning.

SLUBBING MACHINE, OR BILLY.

This performs the first process of spinning; it reduces the cardings, and draws them out in length; jams them together, and gives them a slight twist, in order to form a loose and coarse thread, called a Slubbing, or Roving, which must be spun over again in

THE SPINNING JENNY,

Where the thread is rendered fine enough for the loom. The Jenny has nearly the same parts as the Billy, but differently arranged. The spindles are placed at one end of the frame, and the clasp which holds the slubbings is placed on the carriage, so that it can be moved backwards and forwards, to and from the spindles, by the spinner, in order to draw out and extend the yarn at the same time that it is twisted.

THE MILL FOR SPINNING YARN.

This is nearly the same sort of machine as the mule for spinning cotton, ; and is used for spinning some kinds of woollen yarn, instead of the Jenny. Till lately, however, it has not been in much request, and the Jenny is still thought to spin better yarn; but there is no doubt, when certain modifications are made in it, it will become a much more perfect method than the Jenny, being much less dependant on the discretion and dexterity of the spinner; for if the machine is once constructed so as to spin properly, it will always continue to do so.

The Gig-mill, and the Shearing machine, were not introduced into Yorkshire until they had been several years employed in the west of England, owing to the resistance made to them by the working cloth-dressers, or croppers in the north.

In the manufactured goods made of combed wool, or

WORSTED MANUFACTURE,

several machines are also used of different kinds.

THE STOCKING FRAME

was invented by William Lee, M. A., of Cambridge, in 1589, and was afterwards introduced into France. This invention took place in England only twenty-eight years after the knitting of hosiery yarn on needles had been introduced from Spain.

In the ordinary process of wool-combing, by hand, the implements used are, 1. Two combs for each workman. 2. A post to which either of the combs can be fixed, to support them during the operation. 3. A comb-pot, which is a small stove to heat the teeth of the combs, which is found to facilitate the combing.

CARTWRIGHT'S COMBING MACHINE.

The first combing machine was invented by the Rev. Edmund Cartwright; his first two patents were in 1790, and he had another in 1792; but the machine was not rendered perfect, or brought into extensive use, till a later period; and, in 1802, he obtained an Act of Parliament to renew or extend the term of his patent. Mr. Cartwright proposed to form the raw wool into continued slivers, by joining the pieces of wool together, and slightly twisting them; and in this state they could be presented to the combing machine. This is still the common practice, and takes away great part of the advantage of the machine.

Mr. Hawksley, in 1797, had a patent for the improvement of Cartwright's combing machine: however, there is a

PREPARING MACHINE

for this purpose, which operates very well upon raw wool.

GILPIN'S COMBING MACHINE.

This ingenious machine was perfected by Mr. George Gilpin, of Sheffield, in 1811, and which combs raw wool in a complete manner. The outline of this machine is taken from one invented by Mr. Toplis, in 1793, but very much improved. It is a machine which has the advantages of heating the combs, and of filling them by hand, both of which are essential to any machine which is intended to comb the raw wool.

When the wool is combed, it undergoes the process of

PLANKING,

for which there are the Breaking Frame, the Drawing Frame, the Roving Frame, and the Spinning Frame. Then follows the work of

ROVING,

in which the bobbins of the spinning frame are placed in a row, upon wires, before a long horizontal reel, and the threads from twenty bobbins are wound off together. The reel is exactly a yard in circumference, and when it has wound off eighty turns, it rings a bell: the motion of the reel is then stopped, and a thread is passed round the eighty turns or folds which each thread has made: the reeling is then again continued, till another eighty yards are wound off, which are also separated, by interweaving the same thread: each of these separate parcels is called a lea; and when seven such leas are reeled, it is called a hank, which contains 560 yards.

SECTION XVII.—*Laws relating to Sheep and Wool.*

STEALING of sheep is now made felony, without the benefit of clergy, and many have suffered for the offence.

By an ancient statute, no person shall keep, at one time, above 2,000 sheep; but lambs are not to be accounted sheep, until they are a year old.—25th Hen. VIII., c. 13.

Persons in the counties of Kent and Sussex, within ten or fifteen miles of the seas, are to give an account, in writing, after sheep shearing, of the number of fleeces they have, to the next officer of the Customs; and not to remove any wool without procuring permits, *&c.*—9th and 10th, W. III. c. 40. But all these antecedent regulations required on wool are repealed, 54th Geo. III., c. 78.

Persons exporting sheep shall forfeit them, and twenty shillings for every sheep, *&c.*—12th Car. II., c. 32.

Persons exporting sheep from England or Ireland, or even to Scotland, was made felony, as early as 13th and 14th Car. II., c. 18.

Now the penalty is, forfeiture of every ram, sheep or lamb, and the vessel in which such is shipped, with intent to exportation from Great Britain and the islands belonging thereto; and offenders are to forfeit *3l.* for every sheep, *&c.*, so shipped, and to suffer three months' solitary imprisonment, and till the forfeiture be paid, but not to exceed twelve months: and for any second offence, *5l.* for each sheep, *&c.*, and six months' imprisonment, and till the fine be paid, but not to exceed two years.—28th Geo. III. c. 38.

No wool, wool-fells, mortlings, yarn, or worsted, made of wool, wool-flocks, coverings, cruels, waddings, or other manufactures, or pretended manufactures, slightly wrought up, so that it may be reduced to wool again, or mattresses, or beds stuffed with wool combed or fit for combing or carding, may be shipped or exported, or carried, or moved, for that purpose, from Great Britain, or Guernsey, Jersey, Alderney, Sark, or Man, to any foreign

place, on forfeiture of the wool, with the carriage, ship, or cattle, on which it is laden or removed; but three hundred sheep may be sent annually from Liverpool or Whitehaven to the Isle of Man; and the person so offending to forfeit 3*s.* for every pound weight, or 50*l.* on the whole, and to be imprisoned three months, and till the penalty be paid, but not to exceed six months; and, for a second offence, he is to forfeit the like sums, and to be imprisoned for six months, and till such fine be paid, not exceeding two years; but this is not to extend to lamb skins, dressed for furs and linings.—51st Geo. III., c. 50.

But persons, qualified by the governors of the following islands, may export the respective quantities set against them, from Southampton to those places in every year:

	Tods.
To Jersey . . .	4,000
— Guernsey . .	2,000
— Alderney . .	400
— Sark	200

28th Geo. III. c. 38.

And 20,000 pounds' weight of worsted and woollen yarn, may be exported annually from London to Lower Canada, by permission of his Majesty in council.—27th Geo. III. c. 9; 52nd Geo. III. c. 55.

Wool may be shipped in England, for exportation to Ireland, on being duly entered, and bond given for its true exportation thither, upon obtaining a license under the hands of the commissioners of the customs to allow it.—48th Geo. III. c. 44.

No wool shipped to be sent coastwise from one part of Great Britain to another, until due notice be given, and bond entered into, and a license obtained under the hand of three commissioners of the customs. Penalty, forfeiture,—28th Geo. III., c. 38. And wool must also be shipped, coastwise, in British ships, British owned and manned, the owner of which does not reside out of Great Britain.—19th and 12th Car. II. c. 18.

Wool to be packed in packs, or trusses of leather, or canvass, called "pack cloths," or in linen or woollen, and to be marked "Wool," in letters three inches long, on forfeiture of the wool and 1*s.* per pound. Persons packing wool, *&c.*, into boxes, barrels, casks, or chests, and other, than as above, or pressing or steaming the same, to forfeit the goods and 3*s.* per pound. Insurances for the conveyance of wool, contrary to this act void, and the parties may be punished. Kings' ships empowered and required to search ships for wool, shipped without license. No person can seize wool unlawfully removed but officers of customs, excise, and salt-duties, or persons accompanied by a constable: And persons, neglecting their duty, to forfeit 20*l.*, and making collusive seizures or agreements, to be subject to like penalties as exporters. Hindering, obstructing, or beating officers, subjects offenders to transportation; and bribing of them, whether accepted or not, to the penalty of 300*l.* If any question arise upon the growth of the wool, the *onus probandi* is to lie upon the owners. Informations may be laid in any court of record and penalties, *&c.*, under 200*l.*, may be determined before two justices of the peace; and justices at quarter sessions may direct ships, goods, wool, *&c.*, to be sold. Prosecutions to be commenced within three years.—28th Geo. III., c. 38.

Wool, the growth of Ireland, may be exported to England, and no where else.—1st W. and M., c. 32.—7th and 8th W. III., c. 28.—10th and 11th W. III., c. 10.—26th Geo. III., c. 11.

And the Admiralty is to appoint three ships of the sixth rate, and eight or more armed ships,

to prevent the exportation of wool from Ireland to foreign parts—5th Geo. II., c. 21.

Wool, the produce of any of the colonies, &c. in America, or countries on the Continent of America, subject to any foreign European states, imported into certain British West India islands, may be imported into Great Britain, under the regulations of the 12th Car. II., c. 18.

Those places are, Jamaica, Granada, Dominica, Antigua, Trinidad, Tobago, New Providence, Crooked Island, St. Vincent, Bermuda, Caicos, Tortola, Curaçoa, and the Bahamas.—27th Geo. III., c. 27.—45th Geo. III., c. 57.—47th Geo. III., c. 34.

British hare or coney wool, may not be exported (except to Ireland—39th and 40th Geo. III., c. 67.) on penalty of forfeiture. The owner or shipper to pay 100*l*., and the master of the ship 40*l*.—24th Geo. III., c. 21.

Chapter III.—LIVE STOCK.

GOATS.

Section I.—*Nature, Uses, and Character.*

The domestic kinds of these animals, from their great utility in different ways, the ease with which they can be kept on various coarse and almost waste vegetable matters, and their hardy mode of lodging, may probably in many situations be found of much benefit to the cottage-labourer, and others occupying small portions of land, where cows can only be kept with great trouble and expense. In all such cases the goat may be a very useful substitute, and be the means of affording considerable comforts and supplies of food. The breeding sheep-master too may, perhaps, derive no small advantage from the use of the goat in the rearing of his weak and discarded lambs, when once the matter is well attended to and properly practised. The tameness and docility of the goat may likewise render it useful for some other purposes of the more domestic kind.

Naturalists have described the goat as being covered with hair, and not with wool; and as having horns less crooked than those of the sheep. The animals of this class have the horns hollow, turning upwards, and bent back, compressed, and rough; front teeth in the lower jaw eight; canine teeth none; chin bearded and hanging down. This applies to the whole of the goat tribe, including the common or domestic one of this and other countries, and its many varieties.

APPELLATIVES, OR PARTICULAR NAMES.

The full-grown male is called a buck or buck-goat, also a he goat; the female a she goat; the offspring or young, a male or female kid.

TEETHING.

The age of these animals is shewn by the same marks as those that take place in the sheep, as by their teeth, and the annular rings that form on their horns, and may thereby be equally well determined in all cases.

THE DIFFERENT SORTS OF GOATS.

There are several different kinds of these animals as they are met with in the wild or domestic state, though by no means so many as in some other cases.

ORIGIN OF THE DOMESTIC KIND.

Of those which are in the wild or untamed condition, and known to be still in the state of nature, and which seem to have every probability of having been the parent stock from which the common or domestic sort has originally sprung, the following kinds inhabit different mountainous situations in various parts of the globe.

WILD OR NATURAL SORTS.

These are only very few, as two or three at the most in the opinion of different naturalists. The first, the ibex goat, steinbock, or buck of the rock, as shewing the nature of the regions and places in which it commonly delights and is generally found, is met with in several parts of both Europe and Asia, and on all the large chains of mountains in the northern parts of the ancient hemisphere, upon the Alps, the Pyrenees, the Apennines, and the Tyrol. In Asia, it is discovered on the summits of the chain of mountains which extend themselves from Taurus along between Eastern Tartary and Siberia. The tract beyond the Lena is likewise inhabited by it, and it is a native of the mountains of Kamtschatka. It is not uncommon in Arabia, nor in the high mountains of the Isle of Crete, but seems rather to abound in the latter.

In its general appearance it has much resemblance to the common domestic goat, but is much larger, with more vigour and activity. Its colour is a deep hoary, or greyish brown, much paler or whiter underneath, and on the insides of the limbs; the outsides being dusky or blackish on the lower parts; the back is distinguished by a distinct black line along it. In the body there is a robustness, the head is short, small, and compressed; the eyes but small, yet full of fire and expression. The horns in the male are very large, having the length of from two to three feet, and weighing eight or ten pounds; they are of a livid blackish colour, and are impressed on the upper surface with transverse protuberant semicircles, which are supposed, by their number, to shew the age of the animal, an additional one being formed every year. These horns are thick at the base, and sometimes become of such magnitude as to extend the whole length of the body. The female is smaller than the male, and her horns are smaller in proportion, less distinctly impressed with semicircular protuberances, and much weaker than those of the male. The legs are short, but those of the males very stout, and the hoofs short. The tail small, and in colour blackish. The young of this sort of goat are of an ash-coloured gray cast.

This animal, in its manners and general habits, has much resemblance to the common goat, but possesses every quality of strength and activity, in a degree proportioned to its natural state of wildness.

It delights to inhabit the most inaccessible places among rocks and precipices in the highest regions of the mountains, where it finds every thing that is necessary to its frugal subsistence, in the midst of solitude and security. These animals have been observed on many of the loftier ranges of the mountains in the Isle of Candia, and several others in the same sea, as well as above the upper half of Mount Olympus, where hardly any quadrupeds are to be seen, except a few bears. In this lonely waste of nature, these animals seem to be wholly masters.

The next sort, the Caucasian Ibex, is found inhabiting the lower mountains of Caucasus and Taurus, almost the whole of Asia Minor, and may, in all probability, extend even to India. It is very abundant on the inhospitable

hills of Lann and Chorasan, in Persia, and is said to be found in Africa. Some are also, on good grounds, inclined to believe, that it may exist in Crete, and even on the Alps. It is asserted, that this animal has the power of saving istelf from injury, by falling from a considerable height upon its horns.

It is greatly superior in size to the common goat, and in form, in some measure, resembles the stag. The general colour of it is grayish, with an intermixture of the rusty or ferruginous above, and white beneath. The forehead is nearly black, which colour is continued in a narrow stripe or line along the middle of the back to the tail. The chin is furnished with a large beard of a dusky cast mixed with chestnut. The horns, which are very large, and bend considerably backwards, are smooth, black, sharply ridged on their upper part, and hollowed on the exterior side; they have no appearance of either knots or rings, but are marked on the upper surface by some faint undulations or slight wavy wrinkles: they are about three feet in length, and stand close at the base, about a foot distant at the widest part, and eight or nine inches at the tips. The female has either very short horns, or is wholly without them, and has no beard. In point of strength and agility, this is at least equal, if not superior, to the first sort.

The last, which is found inhabiting the bare schistous summits and cliffs of Mount Caucasus, near the rise of the Terack and Cuban Rivers, is considered by some as a variety of the last sort, but others think that it should be looked upon as a distinct kind.

In its size, it nearly agrees with the domestic goat, but is broader and shorter, and the horns of the male are much larger in proportion, being sometimes more than two feet in length. In the male, the horns are darker than in the female. The animal, in colour, is of a ferruginous or brownish gray above, with a somewhat duskish spiral line: beneath white: extremities black. The hair, at the base, is cinereous, rigid, and intermixed with wool. They intercopulate in the beginning of autumn, and the female brings forth her young in the early spring.

From one or other of these sorts, the tamed kinds of goats must unquestionably have originated, as will be further noticed below.

COMMON, OR DOMESTIC TAMED, SORTS.

The breeds, varieties, and kinds of these, are more numerous.

The common goat of this sort has the horns arched, with a bending outwards at the extremities. In size, robustness, strength, and agility, it is very much inferior to the wild goat, but it inherits the same disposition for feeding on and inhabiting high, rugged, and almost inaccessible situations of the mountainous kinds. Its colour is various, being either black, brown, white, or spotted. The Welch sort is supposed to be far superior in size, strength, and fineness of the hair, to those of other mountainous countries. The French and Alpine goats are generally short haired, reddish, and small horned; while the horns of the former sort have been seen more than three feet long, and branching three feet asunder between the tips. In its tamed state, it is met with in almost every part of the globe, bearing the extremes of heat and cold without much inconvenience, but differing in its form and some other matters, according to the operation of different causes and circumstances. Originally, it would seem to have been confined to the old world, whence it was transported into America; as it is believed, on very satisfactory grounds, that it was wholly unknown to the

inhabitants of that country, until after its discovery, when they received it from the Europeans.

Some, as seen already, have considered the first of the above wild sorts as the parent stock from which the domestic goat originated. Others, however, though they allow that this may be the case, are disposed to think, with not less probability, that it may have taken its origin from the second of the same wild sorts. And the latter supposition is probably the most general, and the best supported by reason and observation. To ascertain the matter with precision is perhaps impossible, as it must naturally be involved in much ambiguity.

It can hardly be supposed, with the fanciful naturalist, Buffon, that the race of domestic goats were raised from an intermediate breed between the ibex goat and the chamois antelope; as their exterior characters, and internal structure, without considering the differences in their habits and manners of life, must destroy every conception of their being specifically the same. They cannot, consequently, be the lineal offspring of such a cross; yet the evidence that has been given renders it not improbable, that they may be the produce of the ibex goat, in which case, the difference between the internal conformation of that sort and the common domestic goat, cannot be so very evident as has been pretended. It has been proved, that the ibex goat sometimes couples with that of the domestic kind, and produces a mongrel breed. And long before that fact was known, it was well ascertained, that the goat would couple with the sheep, the hybrid produce of which is very little different from the natural offspring of the ewe and ram, except that the former have a hairy instead of a woolly coat. But it is yet to be learned, that an intermixture of the goat and sheep may be productive of a *fertile* mule breed, which the above naturalist supposes very possible.

THE ANGORA OR FINE-FLEECED KIND.

The Angora goat is a sort or variety which is naturally confined to narrow limits, being produced only in the small tract that surrounds the towns of Angora and Beibazar, which are situated in a little district of Asia Minor, not far from Smyrna, which tract is singular in its produce of other sorts of extraordinary animals, as well as those of goats, with hair of uncommon length and fineness. It is supposed, but perhaps unjustly, that it will degenerate in other situations.

In general, it is of a beautiful white colour, with short legs, and black, spreading, spirally-twisted horns. The hair over the whole body is disposed in long pendant spiral ringlets; the ears are pendulous, and the horns in the female, instead of divaricating, as in the male, turn backwards, and are much shorter in proportion.

This animal, in its native tract, is very highly esteemed, and not without reason, as it is a source of great riches; the finest and most costly robes of the highest orders there being fabricated of its silky coat, and, consequently, it bears a very great price. Most of the nations of Europe employ agents for procuring the greatly-valued wool of this animal, which cannot be sent out of the country in the raw state, but must be first formed into thread, as numbers of the inferior classes gain a living by spinning it. The people, in its native abode, are extremely tenacious of it, and work up the wool of it into their home manufactures, a sort of superfine shalloon or camlet. The filaments of the wool of the Angora, wool, or shawl goat are long, delicate, silky, and naturally curled; of extreme fineness, and superior in softness

and pliancy to the finest Merino fleece. The wool in every part of the animal is equally fine. About two thousand looms are constantly employed at Angora, in manufacturing this wool, each loom occupying from five to fifteen workmen. In Europe, the most considerable manufactories of camlets, fabricated with this sort of wool, seem to be those at Lisle and Amiens in France. In order to preserve this beautiful hairy wool in perfect condition, the goat-herds at Angora are peculiarly careful of their flocks, washing and combing them with the greatest care; the mere change of pasture, it is asserted, but without proof, often makes them lose their beauty. The flesh of this goat is said to be far superior to that of the common kind.

THE SYRIAN KIND.

The Syrian goat is a sort or variety which abounds on a mountain termed Mambre or Mambra, that is situated in the middle part of Palestine, near the river Hebron. It is common in many parts of the east; and the usual goat of Aleppo, the inhabitants of which it supplies with milk, which they prefer greatly to that of the cow or buffalo. At Cairo these goats are driven about in small numbers every morning through different parts of the city, when the inhabitants see the milk taken from them as wanted.

This sort of goat is principally distinguished by the great length of the ears, which are pendulous, and sometimes reach so low as to be inconvenient in feeding; in consequence of which, it has been fabulously asserted that, on such occasions, their owners are under the necessity of cutting off one of them, in order that they may feed with more ease. On better authority, however, it has been distinctly stated, that the ears never reach so low as to touch the ground, or ever require to be cut off. Its colour is reddish, in general, with short blackish horns.

CASHMERE GOAT KINDS.

This goat is considered as differing in many respects from the common domestic kind; it has hanging ears, and a sort of curled tail and horns, for the most part, straight, and crossed or barred. It is not, in general, larger than the common goat, but it has more body; and when compared with the white sort, there seems to be a difference similar to that between the full blood and common horse. The milk of this sort of goat is so nutritious and abundant, that the young ones, when three weeks old, are as large and strong as the young of the common goats at the age of three months. Goats of this kind have lately been successfully introduced into various parts of France, and are remarkably tame, and easily kept in flocks. They are fed and kept at as little expense as the common goat, as they eat almost every thing, even potato-tops, weeds, withered flowers, and branches and leaves of all kinds; they, of course, take nothing from the pasturage of other animals; and they may be kept in any large grounds or pastures, merely on the waste matters they contain.

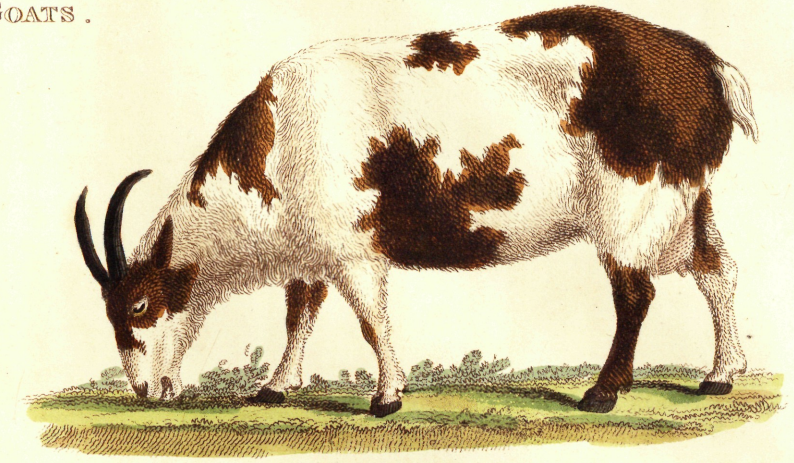
THE AFRICAN DWARF KIND

The African goat is a small or dwarf sort or variety, met with in some parts of that country. It has the horns small, very short, depressed, and lying close on the head or skull, but they are thick and triangular, being still shorter in the female. The hair is rough. The native country of this variety of goat seems sometimes to have been mistaken, as it has been supposed by some to be an American animal. But though it was originally a native of Africa, it has long since been carried to America, where it succeeds well, and appears to have under-

GOATS & DEER.



DOMESTIC GOATS.





FALLOW OR VENISON DEER.

London, Published by Thos Kelly, *17, Paternoster Row, June 1, 1822.*

gone no other change from the effects of its new climate, than that of becoming somewhat more diminutive in size. There are also goats of the same or a similar sort, which are very small, not much above the size of the kid, with long hair: the horns, which are short and thick, bend backwards so close to the head, as almost to penetrate the skull.

THE WIDAWAN OR BUCK OF JUDAH KIND.

The Widaw goat is a sort which collects in herds, and is much attended to and cultivated in most parts of Upper Egypt. It is a dwarf sort found in various parts of Africa; and is also very common in Guinea, Angola, and all along the African coast. It is considerably smaller than the common domestic sort, being diminutive, but often very fat. The flesh is well tasted, and considered as excellent food.

There is a variety of this sort of goat, which has longer horns; the hair is long and silky, and on the whole it bears some resemblance to the small Angora sort. It has been described as being considerably larger than the other, measuring two feet nine inches in length, whilst that was only twenty-four inches.

THE PORTUGAL, OR LARGE MILKING, KIND.

In Portugal they have a large sort of goat, which is remarkable for the quantity of milk that it affords, as a gallon and a half or more in the day. It is probable, that this would be found, on trial, a very useful sort for many purposes here, in rocky mountainous situations, where the sterility is such, that no other kind of milk-giving animal can have the least possibility of being subsisted.

ADVANTAGES OF THE GOAT.

From the above account of the different kinds of goat, it would seem evident, that, under different circumstances, it is equally or perhaps more valuable, in many respects, than some other animals of the domestic kind; while, at the same time, it is capable of living on a more coarse and far inferior sort of diet, is more hardy in its nature, and less liable to inconveniences of any kind. It is, of course, well suited to many mountainous, rocky, heathy, barren situations, where other sorts of animals are wholly incapable of being maintained, as it would be an acquisition of much value, whether with a view of supplying with milk or other products; for which purpose the proper sorts might be raised, and improved in the best manner. In point of milk, the large Portugal sort would probably be the most beneficial; but, in respect to flesh, suet, and fineness of fleece and wool, the Welch, Angora, and Thibet sorts, would be far more valuable. The two latter sorts would also be especially suitable, in consequence of their naturally inhabiting rocks and mountains, where they experience a very considerable degree of cold, and much severity of season, which circumstances admirably fit them for thriving in this country.

The different kinds and breeds of goats should probably be kept distinct, as much as possible, as, by mixing them too much, some of their valuable properties may be liable to be lost or very much injured.

A figure of the common male and female goat is given in the subjoined plate, which may be useful in showing the nature and differences of their several parts and points of utility.

SECTION II.—*Circumstances to be regarded in the Nature, Provision, Breeding, Rearing, Feeding, and Managing of Goats.*

THE goat has been correctly described, by some naturalists of high character, as being,

in its nature, an animal much superior to the sheep, both in its instinct, activity, and natural powers; that it approaches man readily and voluntarily, and is easily tamed and domesticated; and that, even in the natural wild state, it shows no ferocity of disposition. It is sensible of caresses and kindness, and capable of a considerable degree of attachment. It is stronger, lighter, more agile, and less timid, than the sheep. It is with much difficulty that it is confined, being of a sprightly, capricious, and wanton disposition. It is fond of retiring into places of solitude, and to climb up, stand upon, and even sleep, on rugged lofty eminences, and the very points of steep rocks. It is robust, and easily nourished and kept by the most coarse and common fare, such as is not capable of supporting any other animal of the same size, or of being eaten in almost any other way; for there is hardly any herb, or the bark of any tree, which it will not feed upon with effect, and without sustaining injury. Its bodily state, which in all animals has much influence on the natural disposition, is not essentially different from that of the sheep. The two animals, the internal structure and conformation of which are nearly the same, are nourished, grow, and multiply, in the same manner: the diseases, also, to which they are subject, are, in some measure, the same, only the goat has fewer. The goat does not shun, like the sheep, a great degree of heat; it cheerfully, and with seeming delight, exposes itself to the sun, sleeping under its most burning rays, without being in any way inconvenienced by it. It is not afraid of rain or storms, but seems to feel the effects of very severe cold. The inconstancy of its disposition is marked by the irregularity of its actions. It walks, stops short, runs, leaps, approaches, or retires, shows or conceals itself, and flies off as if actuated by mere caprice, and without any other cause than that which arises from a natural vivacity of temper: the suppleness of its organs, and the strength and vigour of its frame, are hardly sufficient to sustain the vivacity and rapidity of its natural movements.

The goat, when pastured with sheep, will constantly take the lead of the flock; but they love to feed separately, and on the tops of hills, preferring the most elevated and rugged parts of mountains and rocky heights. They find sufficient nourishment in such dreary places, and in heathy, barren, and uncultivated grounds and spots of all kinds. When suffered to go among copses, and young plantations, they often, however, do great mischief, as they eat with avidity the tender bark and young shoots of the trees, and thus injure their growth and beauty. But though they frequently break into the corn-fields and pastures, it is probable, that they feed but little on either the grain or grass, being seen constantly picking in the hedge bottoms and other similar places. They, in all cases, carefully avoid moist ground, marshy meadows, and rich, soft, grass-lands. They can seldom be reared with advantage in flat, even countries or tracts of land, as they never thrive so well as in the drier and more high situations, nor is their flesh, in other cases, so good.

The common goat is raised and cultivated for its various products, which are of great use for many different purposes. Formerly, in some parts of Wales, as in the district of Caernarvon, the inhabitants, it is said, suffered them to run wild on the rocks, in the winter as well as the summer; killing them in the beginning of the autumn, for the sake of their fat or tallow, which they did either by shooting them with bullets, or running them down, like deer, by dogs. For this use they were ready, when

about four or five years old. But the alterations and improvements which have taken place in the cultivation of that part of the country, since that period, have induced much change in this as well as other matters. The goat is now probably an animal that is more sparingly raised and cultivated in those parts than before, having been on the decline for many years past; and, at present, is, perhaps, in a great degree, confined to the more mountainous and rocky portions of the above tract: a small sort of sheep, that thrive and succeed remarkably well on those spots where the goats used to be kept, having superseded them. In fact, the rearing of cattle, and especially sheep, is supposed, by the more modern cultivators of this district, to be more honourable, as well as more beneficial, than that of the goat. The goat, however, as it feeds but little on the natural grass of such situations, and always prefers coarse vegetables and plants, might still, in all probability, be made profitably to keep its place in such wild tracts, without injury to the sheep, by the simple cultivation of a few coarse hardy matters on them, where the food is not originally in plenty for both. This animal is probably met with in greater numbers amidst the vast range of cliffs that overlook the pass of Pont-Aberglasslyn, than in any other part of the northern division of the district, and in the southern division of it, the goat is rarely to be discovered.

It is not, however, only in such situations as these, that the goat may be found useful, but in many others; where the keep of small cows cannot be provided without much inconvenience, such as waste tracts, where, however, coarse refuse food is sufficiently produced for the use of goats. In such a place they may prove of the utmost importance in supplying the means of support to families. They seem to be well adapted for such uses, not only by their habits and modes of keeping themselves, their great cleanliness in their resting-places, and the little room they require, but by the quantity of milk which they continue to afford for a great length of time together, and the many other valuable products which they are continually affording. In all these respects, the goat may be looked to with a certainty which no other animal of the domestic kind can probably afford. In such cases, therefore, the proper sorts of them should be provided, and raised in suitable numbers, rendering them as tame and domestic as possible, from the earliest periods of their existence, so that they may become most useful for family purposes.

The cottagers, or other small occupiers, should, with this intention, take care to have the places near their residences, where they are to feed, kept constantly well stocked with different sorts of those coarse plants which they most delight in; which may easily be done, by merely sowing the seeds of them on such spots at the proper seasons, without any further cultivation, as this is the natural method in which they are produced. Such seeds may thus be provided with little trouble or expense; and the increase of keep will be so great, as to put almost every difficulty at defiance, even in the most naturally barren and steril spots. In other countries, goats are kept and managed in some such manner with the greatest advantage, from their daily supplies of good milk, and there can be no reason why they should not answer equally well in this. The milking of the goat is effected with the same facility as that of the cow; and the milk, probably, far surpasses it, for most domestic purposes, and is, without doubt, much superior in its nutritious properties; so that custom and habit are, perhaps,

alone wanting, to render the goat as great an object in such situations as the cow is in others. Hitherto but little attention has been bestowed upon propagating, rearing, and improving the goat; so that the quantity of its produce in milk is much less than it might otherwise be, if proper care were taken in these several respects, and in the feeding, milking, and managing it. Instead of giving two or three pints in the day, as is now usually the case, it might, in all probability, be made to give as many quarts, or more; which, considering the length of time goats continue in milk, without much decline in the supply, as a year and a half or two years, their value, under such circumstances, must be very great. The quality of the milk has also been greatly esteemed for its powers in restoring enfeebled constitutions, and particular places are resorted to for taking the milk and the whey prepared from it. Such are the valuable properties of this animal; which has hitherto been too much neglected. It may be observed, that the male goat becomes capable of getting young at the age of one year, and the female of taking him, at the early period of seven months; but as the produce of such early coupling is generally weak and defective, it is better to restrain them until they be eighteen or twenty months old.

Goats are scarcely ever permitted to grow to their full age, or perhaps they might reach eleven or twelve years, in this climate. Their excessive venery probably shortens their lives in some measure; but it is the usual custom, to fatten and kill them as soon as they cease to be productive, as the older they grow the more their flesh deteriorates.

Both the old and the young of these sorts of animals seem to be in some degree affected by the state of the weather in the different seasons, those which are rainy and wet rendering them thin and lean, while those which are dry and sunny make them fat, plump, and lively.

The kid, or young of the goat, when fattened in the manner of the lamb, is considered very fine eating, having a flavour somewhat between that of lamb and venison.

There is an astonishing degree of activity and nimbleness in the goat, which will walk on the tops of houses and ascend steep rocks with the greatest readiness. At first sight, the feet do not seem well suited for such purposes; but on being carefully examined, they are found to be hollow on the under sides in the middle parts, with sharp, upright, horny edges, that are admirably adapted for laying hold of such surfaces, and keeping the animal from falling.

THE HE GOAT.

In selecting and providing the male goat for the purpose of propagation, particular attention should be paid to his age, strength, and perfections. He should be well made, large, and about twenty months or two years old; his head rather small and slender; his ears pendulous, but not too long; his neck rather short and fleshy: his thighs thick; all his limbs firm, straight, and stiff; his body large and well rounded; his hair, or coat, black, thick, long, and soft; and his beard long and bushy; having large horns, and the eyes prominent. The male goat is greatly vigorous and ardent in his passions, but his ardour soon destroys him; he does not last more than three or four years, and by the age of five or six, he becomes wholly or nearly worn out. One male goat is sufficient for accompanying and serving a hundred or a hundred and fifty females for two or three months. The smell of the male goat is extremely unpleasant. During the two first months of autumn, when the females are in season, the whole surrounding atmosphere is

filled with their strong and disgusting effluvium, which some have absurdly supposed to be useful in preventing distempers, especially among horses; in consequence of which the he goat is frequently kept in studs and large stables. The strong smell from this animal does not proceed from its flesh, but its skin. By suitable care, while young, the he goat may be kept in the propagating state as long as the female, but otherwise he becomes exhausted some years sooner, when he is sent to fatten among the common herd or flock. The buck goat is seldom kept to a greater age than five years old.

THE SHE GOAT.

In the choice of the female goat, with a view to breeding and rearing, less care or circumspection is perhaps necessary than in the male; always, however, preferring those which have large, full, and capacious bodies, thick thighs, and good general forms, which walk lightly and steadily, have large distending udders and teats, and soft bushy hair or coats, with very small horns, or none. The female goat is in regular season nearly as in the sheep, from the beginning of the autumn to the end of November, or later; though they will couple and produce young at any time under good keep. At these times, the males often drive whole flocks of them continually about from place to place. The she goat produces, in general, only one kid at a time, sometimes two, very rarely three, and never more than four, except, perhaps, in some warm climates, and then but seldom. She carries her young from four and a half to five months, bringing forth towards the end of winter or in the beginning of the spring; and is in condition for breeding, as has been seen, from the age of seven months, until she is seven years of age. She has only two teats. The female goat, unlike the sheep, will readily allow itself to be sucked by the young of other animals, which is a property that has been well ascertained, and may be of much utility in the raising a portion of the weak and neglected young lamb stock, in the sheep breeding and rearing management, as well as in assisting in the fattening of both early house and grass lamb, being apparently very excellently suited to all such purposes. The use of the goat, in these ways, would most probably not only save much trouble and inconvenience to the attendants, in such systems of lamb-management, but be much more beneficial than the ordinary modes of preserving them, and be attended with but little expense, and much less loss of time; and the effects produced in this way would, in all probability, be of the most encouraging kind. It is idle to say, that nothing of this sort has yet been attempted in this country, as the matter can only be put fairly to the test by correct and repeated trials, made under sufficiently varied circumstances, so as fully to ascertain the point.

It has, however, been well ascertained, in some cases, that the goat, feeding on a barren rocky situation, where there was little else than the most coarse sorts of vegetable productions, has, in the summer season, been able to bring up not only her two kids, but a lamb in addition, in perfectly good order; which is strongly in proof of her importance in such intentions, as those suggested above. She has the capability, also, of supplying a large quantity of milk, perfectly suited to the rearing and suckling of young lambs, and far superior for such uses, than that drawn from the cow; being less liable to injure their stomachs, blow, and destroy them. In the more early stages of its growth, a lamb will seldom require less than from two to three pints of cows' milk in the

course of the day, and in the latter stages, never less than from one to two; while the milk of one goat is capable of supplying the wants of three such young animals, and of keeping them in full condition. That the milk of the goat should be so much better fitted for the rearing and fattening of such young sheep-stock than that of the cow, will not seem extraordinary, when it is considered, how much that animal partakes of the nature of the sheep. But it is said to be better even than that of the sheep itself, and to be either nearly in the proportion of one-third more in quantity, or one-third superior in its quality. The milk of hardy healthy animals, such as this, may also be more nourishing than that of such as are more delicate.

In the consumption of food, the sheep and the goat are probably much upon a par; but the latter requires it of a much inferior and less costly kind; consequently, must be far more profitable in its keep. It will support itself in condition on high, barren, rocky spots, which afford little but furze, briers, small shrubby productions of different kinds, ivy, wild herbs, moss plants, and such like, seeming to prefer such weeds, and the buds and sprouts of such plants, to the best pasture grass. It is, therefore, for the most part, kept on waste matters, and such as would be otherwise thrown away; yet it will eat hay, and various sorts of prepared household waste matters, of the bread and root kinds. On these several accounts, the goat is kept with less difficulty and much less cost than perhaps any other animal of the same bulk, which is a consideration of the utmost consequence, in the different views which have been taken of the uses to which it is capable of being applied in the business of the stock-master.

In the rearing and managing of the young kids of the goat, they should, like the lamb, be kept in the best and most careful manner from the first; so that they may attain the largest and most perfect size, and be in the most tame and domestic state possible, which are points of much consideration, in respect to their future uses and applications.

Goats are capable of defending themselves against the attacks of foxes; and deer will pasture with them, but not with sheep.

Section III.—*Diseases of Goats.*

Though the diseases of the goat are much fewer than those of the sheep, it is not free from the danger of being attacked by a number of the less formidable kinds. This animal, however, chiefly depends upon nature for the removal of the few disorders that it may chance to be seized with; as, in the course of feeding, it generally meets with and picks up such herbs and plants as are salutary in preventing or removing the particular complaints to which it is subject. Sometimes, however, it may stand in need of the more powerful and active remedies of the experienced practitioner. The affections with which it is principally troubled are those which take their rise from cold and damp; from too much constriction or relaxation of the bowels, and from local inflammatory attacks in the feet, and some other parts.

CATARRHAL ATTACKS, OR COLDS.

These are not unusual in the goat, and arise from the too sudden changes from cold to heat, to which it is, in some cases, particularly liable, in consequence of exposure to the moist cold air of the atmosphere in the day, and being shut up in close warm places in the night-time, as well as from other causes.

The appearances that commonly indicate the presence of such complaints are, dulness, want of activity, and an unusual discharge of a thin mucous fluid from the nose, with sometimes a sort of wateriness in the eyes, and an inclination to creep into corners and retired places.

In the removal of such complaints, much will depend upon constantly keeping the animals in a moderate state of warmth; letting them have their hay or other food, when given in the house, just slightly warm, by steeping and other means; not suffering them to be confined in too close a manner, so as to prevent their having proper exercise in walking and running about.

In cases where such attacks do not disappear under such mild methods of treatment, recourse should be had to the more effectual remedy directed below:

Take of—Horehound, cut small, half a handful,
Penny-royal, dry, two ounces; infuse them in
Boiling water, a pint and a half, for eight or ten hours; then strain off the liquor, and add, of
Compound tincture of camphor, half an ounce,
Liquid honey, one ounce; mix and make them into an infusion; a small hornful of which should be given while just warm, once or twice in the day, as there may be occasion.

But when they assume a more formidable aspect, it may sometimes be necessary to use medicine of a more powerful kind, such as the following:

Take of—Antimonial powder, five grains,
Camphor, in fine powder, ten grains,
Soft sugar, a large spoonful; mix them into a powder, and give it once a day in a large cupful of the above infusion.

If the bowels be in too constipated a state, the ball directed underneath may be still better, and should be given in the same manner:

Take of—Antimonial powder, four grains,
Submuriate of mercury, or calomel, three grains,
Liquorice-root, in powder, and
Confection of rue, as much as are necessary to form them into a small ball.

COSTIVENESS.

This is rather a common kind of complaint of the goat, when feeding on some of the less juicy sorts of food, such as hay, cut chaff, and some particular sorts of plants and barks that are of the more astringent kind.

When costiveness continues to exist, after suitable kinds of laxative juicy food have been given in proper quantity for a day or two, it will be necessary to have recourse to such remedies as have the power of speedily removing the cause of such a state of the bowels in these animals. These may be of the more mild laxative sort, or such as have a stronger action in removing the complaint.

This hurtful state of the bowels, in these animals, is rendered evident, by the great fulness, hardness, and distention of the belly; by the frequent ineffectual endeavours to have passages, and sometimes by the appearance of great heat and thirst, with loss of inclination for food.

The remedies, in all cases, are to be well suited to the state of the animals, and that of the degree of constipation which is present, so as that the evacuatory effect which is produced may be neither too little nor too great: as by the former, the proper relief may not be afforded; while by the latter, injury may be done in weakening the animals, and rendering them less useful.

It is best to begin with the milder sorts of these means, such as the following:

Take of—Castor oil, two ounces and a half; rub it well and slowly with the yolk of egg, until well incorporated, and then add gradually,
Strong infusion of senna and caraway seeds, three ounces,

Solution of subcarbonate of potass, or lees of tartar, half a drachm,

Tincture of rhubarb, two drachms,

Treacle, half an ounce; make them into a mixture or drink; which is to be given, as there may be occasion, in a hornful of thin warm gruel.

But where more expeditious and active remedies of these kinds are found to be necessary, such solutions, as that which is given below, may be the most proper and effectual for the purpose:

Take of—Sulphate of soda, or glauber salt, two ounces and a half; dissolve it in a gill and a half of a strong

Decoction of senna, with cordial seeds, while boiling hot; then add,

Tincture of senna, two drachms and a half,

Syrup of buckthorn, half an ounce; make them into a solution, which is to be given while just warm, and repeated as there may be a necessity, or until the bowels are rendered quite free and open.

When this state has been perfectly restored, there should be a proper attention paid to the food of the animals for some time afterwards.

LOOSENESS, OR SCOUR.

While feeding on grassy herbs, and the more juicy plants, goats are not unfrequently liable to be attacked with purgings, which, when they become violent and of long continuance, require to be restrained by proper remedies, otherwise the animals become much reduced in condition, and are sometimes destroyed.

These diseases chiefly arise in these animals on their coming to feed on the rich juicy matters in the pastures, or other places, in the more early part of the spring season, when they are taken from a more dry keep; the change being very great and sudden, serves to operate very mischievously on the stomach and the whole alimentary canal, especially in wet, damp, and continued moist weather.

The appearances which denote the presence of the complaint are, a dulness and drooping in the countenances of the animals, and a loss of the desire for food, with twitchings, irritations, and gripings in some part of the bowels, and slimy, mucous, and thin fæcal discharges from them, at times. If the disorder is violent, or of long continuance, a gradual wasting away, or loss of flesh, becomes evident.

In order to prevent or cure all such disorders in these animals, they should be removed as soon as possible into other feeding-places, where the food is of a more hard and dry kind, some correcting substance being occasionally given them, in proper quantity, such as a little bran, cut hay, or chaff; and they should also be housed, or put in the yard, during the night time, for protection from the effects of cold and damp.

When, notwithstanding these means, the disease still continues to increase, other remedies must be resorted to.

The alimentary canal should, in the first place, be cleared out, by means of fifteen or twenty grains of finely-powdered root of rhubarb, with three or four grains of the submuriate of mercury, or calomel, mixing them well together, and giving them, by the horn, in half a pint of thick oatmeal gruel, while just warm. Afterwards the decoction directed below, may be employed with much benefit in most cases of this description.

Take of—Calcined or prepared hartshorn, in powder, six drachms,

Shavings of hartshorn, two drachms,

Linseed, bruised, one ounce and a half,

Common chalk, powdered, half an ounce,

Cassia, in coarse powder, one drachm; boil them in a pint and a half of water, to one pint, then strain off the liquid, and add,

Tincture of kino, two drachms, and make them into a decoction; which is to be given in the quantity of a small tea-cupful once or twice in the day, with from twenty to thirty drops, or more, of the tincture of opium in each dose, as the state of the disease may be.

These remedies are generally sufficient to put an end to the disorder; but when that is

not the case, and the complaint gains ground, substances of a more powerful astringent quality must be employed, such as the extract of logwood, Japan earth, and opium, in the solid form, in the proportion of about a drachm of the first, half a drachm of the next, and a grain or a grain and a half of the last, made into a ball with treacle, and given, as may be necessary, in about half a pint of some strong mucilaginous fluid, as an infusion of linseed, or marshmallow root.

INFLAMMATORY AFFECTIONS OF THE LUNGS, CHEST, AND BOWELS.

It occasionally happens, that these animals have local inflammatory attacks in these different parts, which are very troublesome and distressing, and if not soon removed, become dangerous.

The symptoms of the two first are, frequent short huskings, or tickling coughings, and much heat, uneasiness, and pain about the ribs and chest, with strong beatings in the vessels, and little or no discharge from the nostrils; the eyes dull, the thirst great, without any desire for food. In the last, there is evidently great pain and uneasiness, with soreness in the bowels, a quick pulse, and great heat and thirst.

The cure of these attacks must principally depend upon the speedy removal of their inflammatory states, by the use of proper evacuating means of different kinds, and by giving the animals mild diluting drinks in a plentiful manner.

In mild cases, the cure is often effected by a dose or two of castor oil, in the quantity of about two ounces; but where they are more severe, they frequently require a little blood to be drawn once or twice, after which, full purges of the kind directed below should be administered:

Take of—Sulphate of magnesia, or Epsom salt, two ounces: dissolve it in

Infusion of Senna, while hot, four ounces,

Liquid honey, half an ounce; mix and make a solution, which is to be given while a little warm, at proper intervals, until the bowels be well opened.

These, with suitable watery drinks, will ge nerally soon remove all such complaints.

LAMENESSES IN THE FEET, FROM INFLAMMATIONS.

These animals, like sheep, are subject to lameness in the feet, from local inflammatory affections, that take place in the parts of them, and cause much pain, by which they soon become in a declining state of condition.

The disease is perceived, by the sudden lameness and halting of the animals—by painful swellings taking place in the horny or some other parts of the hoofs of the feet of them, which sometimes break out into a state of corroding ulceration. It more commonly attacks the fore feet, and has its seat on the horny, outer parts, or in the clefts of them, being occasionally attended with an acrid loathsome discharge.

In the cure of these ulcerous swellings, the feet of the animals should be carefully examined after they have become quite dry, and have been made quite clean; paring away the hard diseased portions, as far as they extend, and laying them well open, when necessary, to promote a free discharge. In mild cases, the parts should then be washed with a rather strong solution of the sulphate of copper or blue vitriol, in vinegar, which will, in general, remove the complaint; but in case it should not, and the disorder is very severe, stronger caustic applications, of the liquid kind, must be had recourse to, such as the butter of antimony, spirit of salt, or others of the same nature, keeping the feet of the animals quite clean and

free from moisture. One or two applications of these kinds, which are usually made by means of a wooden skewer, are commonly sufficient, unless the ulcerations are of greater extent than has been at first suspected, when the whole must be opened and washed, before the cure can be completed.

SCAB AND ROT.

These are complaints to which the goat is occasionally subject, and which require the same sort of treatment, in every respect, as is practised for sheep, and which practice is pointed out under the proper heads among the diseases of sheep.

SECTION IV.—*The Nature of, and the different Uses and Purposes to which the several Parts and Products of the Goat are appropriated and applied.*

THE different varieties and sorts of goats, possessing different advantages, will be selected according to the intentions and purposes for which they are designed, as one sort has a great superiority over another, in certain respects, and for certain uses. The common domestic goat, though it may not possess the fine fleece and some other valuable properties of that of the Angora kind, or have the particular excellencies of some other sorts, is still endowed with many useful products, that are held in high estimation, and are of much benefit to mankind. A primary and material advantage is drawn from it in the very valuable nutritious fluid which it affords, that of

MILK.

This fluid, which is perhaps the most wholesome kind of milk, it supplies, as has been seen, in large quantities, for a great length of time. It curdles easily, and with great equality and readiness, making very excellent cheese, either alone or in mixture with that of the cow. For the purposes of rearing and fattening the young of some other similar animals, as well as for most domestic uses, it is probably better adapted, than that of any other animal whatever. In these views, the milk of the goat should be particularly attended to, as capable of being beneficially employed in many circumstances and situations.

FLESH.

The flesh of the old goat, when not kept to too great an age, is very useful and good, if properly dressed; and that of the young kid is considered very fine, when well prepared, and brought to the table in the manner of lamb. Two or more kids, under good keep, will generally be produced at a time; and, in some cases, more than once in the year. The flesh of the old goat, indeed, in some instances, may afford a cheap provision in the winter season, especially where the haunches and legs are salted and dried, as was formerly much the practice in some parts of Wales, supplying all the uses of bacon, and being there termed *coch yr wden*, or hung venison. Young kids are also sometimes brought to the market for sale at that season. But the meat of the spayed goat, of six or seven years old, was there, it is asserted, considered much the best, being of a fine sweetness in the flavour, and of a good fatness. It was called, there, *hyft*.

SUET.

The tallow of the goat is in great esteem; and, in some places, the animals were formerly killed, in great numbers, solely for the sake of it, after being kept for a proper length of time, for producing it in quantity, as from four to five years, or more. It makes candles of a very superior quality to those which are formed from

common tallow, having greater firmness and whiteness, and being less liable to run in burning. It is, of course, of much greater value in the market, and in certain situations and circumstances pays well for the keep of the animals.

HAIR.

This is another very valuable product of the goat, which may be shorn or cut, in the same manner as that of the wool of sheep, and is a most excellent material for the making of ropes, which are to be used in the water, as they will last a great while longer than those which are made in the ordinary manner. A sort of stuff, of the thin cloth kind, is also made of it, in some cases and circumstances; and it may likewise be very convenient and useful for stuffing different articles of the finer and more small and soft kinds.

HORNS.

These constitute and form most excellent handles for tucks, pen-knives, and many other sorts of small sharp instruments, and are well suited for many other uses, where close, compact, horny substances are necessary.

SKIN.

The skin of the kid is particularly well adapted for the glove manufactory, not only on account of its greater fineness and closeness of texture, but likewise from its taking the dye better and more evenly than most other sorts of skins. The skin of the old animal is also useful in several instances of the more common kinds, and is equal or superior to that of sheep in general. For the purpose of tanning, the skin of the goats of some foreign countries is better suited than that of the common domestic goat of this. These sorts of skins, when tanned, are made use of for lining the insides of coaches and other carriages, for the forming chair bottoms, for covering seats and cushions, for making ladies' shoes and slippers, and for many other purposes.

There is considerable difference in the value of the skins of different sorts of goats, when tanned for different purposes. The best of the common sorts of the southern parts of this country, in the raw or unprepared state, are worth about six shillings each. Those of the more northern parts of the island, about five shillings each; but which would be of more value, if they were dried in a more careful manner, and treated more suitably when newly taken off; at which time they should be cured with wood ashes, as in the case of the skin of the buck, which will be shewn below, in speaking of the parts and products of that animal. The value of the Irish sort is much the same as that of the last kind. Of the African sort, from about Mogadore, in Barbary, the worth is only about four shillings each: but of those from the mountains of Switzerland, the price is seven shillings and upwards, according to the quality.

The goat skins that are brought from Egypt are worth but very little, in consequence of their being so much eaten into holes by a worm of the warble kind, that so often bores into the backs and other parts of neat cattle and horses in this country. By the openings thus formed, and the destruction of the substance between the skin and the flesh, they are rendered almost wholly useless for any manufacturing purpose whatever.

Skins of the goat kind, worth not more than about four shillings, when formed by dyeing into blue or purple leather, become of the value of ten shillings each, or more, requiring about ten penny-worth of American indigo in the preparation of them. When formed into leather of the red kind, they become worth

about eleven shillings each, requiring about eighteen penny-worth of American cochineal in the process of preparing them.

The skin of the goat is capable of being easily formed into parchment, and is occasionally used by the leather-dressers in making an imitation of what is called Morocco leather; for which purpose, the best sort of skin is that of the Corsican sort of goat. It is also known, that the chamois leather can, by the skin of this animal, be so closely imitated, that the difference can scarcely be detected by those who are the most experienced in such matters.

DUNG.

The dung of the goat, like that of the sheep, is valuable for most purposes of cultivation and improvement of land; but as the animal dislikes any sort of littery matter in its lodging-place, it is only small in quantity, and therefore is not much attended to. In many cases, however, where goats are well fed with the better sorts of food, it might be employed as a top-dressing, for different sorts of crops, with great effect and advantage, in mixture with some other light substances.

It, therefore, appears, that, as in the sheep, all the parts and products of the goat are valuable, by different applications, for the uses and purposes of mankind.

Chapter IV.—LIVE STOCK.

DEER FOR VENISON.

Section I.—*Nature, Use, and Character.*

This animal not being in a perfectly tame or domesticated state, has hitherto, from the particular elegance of its form, been chiefly destined as the ornament of large parks and pleasure-grounds, without affording much benefit to the public. Under proper regulation and management, however, deer may be turned to considerable profit and advantage; as they are large-sized, and quick-feeding animals, the flesh of which is of a very excellent quality.

This kind of animal has been described by naturalists as having the horns solid, branched, thickest at the tip, covered, while young, with a downy skin, and annual; front teeth in the lower jaw eight; tusks none, or sometimes one solitary one on each side, in the upper jaw.

APPELLATIVES, or PARTICUAR NAMES.

The *male* deer, in the first year of his age, is called a *fawn;* in the second, he is termed a *pricket;* in the third, a *soril;* in the fourth, a *sore;* in the fifth, a *bar, buck,* or *first-head buck;* and, in the sixth, a *haver.* Of the *haver* there are three kinds: in two of them, the cutting or gelding of which is effected at two or three days old, in one way, so as to have horns, and in the other, not; the *haver,* with horns, being denominated a *full-head;* and the other, without, which is castrated in the winter season, is called á *seg-deer.* These last are often, in the rutting time, apt to get very poor, and when six or more years old, if not taken up and fed with corn or some other such substance, are liable to be destroyed by exhaustion. Their

horns, after they are cut or gelded, grow large, and are never cast; the velvety part still remaining on them: but in the *haver*, or full-headed sort, the horns come off annually, the same as those of other gelded deer.

The *female* deer, in the first year of its age, is named a *fawn*, or *female fawn;* in the second, a *pricket;* and in the third, a *doe;* which she continues ever afterwards.

There is also a late fawn, termed a *green-tail*, which is seldom of much value.

ORIGIN.

The nature of the origin of the fallow deer is involved in some difficulty and uncertainty; but it would seem to have arisen either from the wild elk or the stag, as it has much of their nature and habits; and as there is much similarity in many different respects between it and these animals.

TEETHING.

This process is much the same as that in the sheep and the goat, but more tedious and less exact in some circumstances and particulars. The age is, however, in some measure, shown by the state of the horns and of some other parts.

SECTION II.—*The proper Sort of Deer, for the Production of good Venison, with the Nature, Habits, Manners, Uses, and other Matters relating to it.*

THIS is the fallow deer, which has branched, recurved, and compressed horns, with palmated or flattened summits. It is an animal which belongs to the stag kind, but which is much less general, being scarce in some parts of Europe, as in Germany and France; while in Spain, it reaches a size nearly equal to that of the common stag. It is met with in Greece, in Palestine, in the north of China, and in Persia. The Americans have probably received it from the Europeans, as the deer, under the same name, in that country, is of an extremely different kind, and peculiar to the new continent. It abounds in this country, but is almost wholly confined to parks and other kinds of lawns and pleasure-grounds.

The fallow deer are considered, by some naturalists, as of two kinds, both of which are supposed to have been the original produce of other parts of the world: the spotted, or more delicate sort, it is believed, was brought from Bengal, in the East Indies; while the dark brown, more common, and hardy variety, was probably introduced from Norway. They both of them afford venison of the best kind, for fatness as well as flavour, in the pasture park or other grounds of this island.

The deer of this sort is here a considerably smaller animal than the stag, and of a brownish bay colour, but varying, in different individuals, to a deeper or paler hue, being spotted on the back with white, and, in some cases, though but seldom, the whole of the back is white. Beneath, and on the insides of the limbs, the colour is whitish. The tail is rather longer in proportion than that of the stag, white underneath, and usually bounded on each side by a descending streak of black; but the most material point of distinction between this and the stag is, the form of the horns, which, as in that animal, are peculiar to the male, and are ciliated at the upper part, and palmated or divided into processes, being continued to a considerable distance down the horn. A branch or slender simple process is thrown out from the base of each, and a similar one at some distance above that, both which point somewhat forwards. But though greatly resembling the

stag in its general form, it is less in size, being also of a more easy and gentle disposition.

In its habits and manners it likewise much resembles the stag; but is far less delicate in the choice of its food, feeding on a variety of vegetables, which that animal rejects. It browses closer too than the stag, and is on that account more injurious to young trees and shrubs. It has also the property of preserving itself better for the purpose of venison, and even when the rutting season is over, it does not seem to be exhausted, but continues nearly in the same state or condition throughout the whole year. The fallow buck, about the end of the second year, begins to seek the female, and, like the stag, is inconstant in his attachments. The female or doe goes with young eight months and some days, mostly producing one fawn, sometimes two, but very rarely three at a time. The male and female are capable of engendering from the age of two years until they become old; they are short-lived animals, seldom living to more than eight or ten years of age, and rarely or never to more than twenty.

In the fallow buck, the horns, as in those of the stag, are shed or cast every year, but at a rather later period, as about fifteen days after it takes place in that animal. On their first shewing themselves they resemble a pair of soft, tumid knobs, or points, and are covered with a villous or rough hairy skin; they, by degrees, enlarge, lengthen, and widen at the tops, and when full grown, the skin which had served to protect and nourish the young horn, having then become useless, is rubbed off by the animal; the impressions of the blood-vessels, however, still remaining on the complete horn, in the form and manner of so many ramified furrows or hollow lines. They usually begin to *mew*, or shed their horns, about the middle of the month of April, when the necks of them swell very considerably, sometimes even to double the size they are of, at some other particular seasons of the year.

These animals, during the rutting season, are neither so furious or so violent in their ardour, as the stag. They never quit their own pastures in search of the females, though they will dispute and fight furiously for the possession of them. They are very expert with their horns and feet in fighting, butting like the ram in the manner of their carrying on the fight. It not unfrequently happens when there are a number together in one park or place, that they will divide into two parties, and engage each other with much resolution; but these contests take place chiefly in consequence of the wish each has to graze and feed upon the same particular spot in some part of the ground. Each of these parties has its chief, or master buck, which is at the head; those lead on the attack or engagement, and the rest follow under their direction and movement. One victory is not sufficient in such cases, neither party yielding upon a single defeat; but as the battle is renewed daily, the weakest are at last compelled to retire to some secluded part of the park or ground, and be content with a worse pasturage.

The males and females of these animals seldom mix or herd together, unless in the rutting season, which is not very long.

THE BUCK.

The time for the buck to propagate is when he is approaching two years old, but it is probable that he is capable to do so much before that age when well kept, which should always be the case with a view to venison. It is the buck only which has horns, the doe or female being without them. The buck should be large, strong, and well made in his different

parts, so as that he may be in the most suitable circumstances for improving in growth, and becoming speedily fat, if required, as well as that the produce which he affords may be of the most proper kind.

THE DOE.

The doe is capable of producing young from the age of two years, or, perhaps, rather sooner. The time she takes the buck, or becomes in rut, is from about the middle of October to the same period in the following month, going with young the length of time that has been shewn above, and bringing forth one or more fawns at a time, as has been already noticed. The doe is particularly delicate in taking the buck, being very seldom seen in the act of copulation. She should be clean and well made, with a full body, and other parts necessary in the producing and rearing of her young. The management of the young, or fawns, will be considered hereafter.

USES TO WHICH DEER MAY BE APPLIED.

Hitherto this sort of deer has, for the most part, been kept in large parks and grounds for the fine effect which is produced by their appearance, and for the occasional supply of a luxury in food for the use of those in the higher ranks of society. It cannot be doubted, however, that under different proper practices and management, these deer may be made to serve these elegant purposes, and be at the same time considerably profitable, as there can certainly be no more impropriety in turning one sort of animal to profit than another. This may be readily and easily effected by putting in force a regular system of practice, by which all the weak, enfeebled, and disabled young deer of a park or other place, which are generally considerable, and such of the others as are in any way imperfect, may be in a constant exact course of being made fat for the purposes of sale. The detail of such a practice, which has been very successfully carried into complete effect and execution, will be fully given below; however unprofitable the business of raising and fattening deer for sale may hitherto have generally been considered. By taking away such of the young deer as would in all probability die, or become disadvantageous to keep, the utility and benefit of deer-keeping becomes placed in quite a new point of view, and the capability of its being highly profitable, is extremely great. The winter losses of young deer in parks and other places is not unfrequently very great, for want of some such steady system of practice as this, by which they may be capable of being turned to the best advantage in a regular manner; as in such cases every deer, which otherwise from the severity of season, accident, or other causes, would be lost, will be turned to much profit; as the expense of fattening is a mere nothing; while the greater cost and trouble of bringing them to an age for sale, where they are capable of it, is wholly avoided. Young deer, under all sorts of misfortunes and accidents, even those of broken legs, have been found to fatten, and succeed well in this system of management when properly executed. By means of this simple practice, an animal which has hitherto contributed but little in the way of food, may be made to afford it in a considerable proportion, and be rendered capable of re-paying the expense of its keep with great profit.

SECTION III.—*Matters to be attended to in the Breeding, Rearing, Feeding, and Managing of Deer.*

In the breeding of deer, the does have seldom

any particular attention bestowed upon them; but if they were well supported in the winter season, while with young, it would be of very great advantage to them, as well as the young fawns produced. Such supports might be easily afforded, as they will eat most sorts of dry fodder, such as tare hay, common hay and pea straw, when they have not plenty of food in their pastures and among the woods and trees in the shoots, acorns, and haws. It is common to fodder the whole herd with hay or some such substance when very severe weather sets in at the above season, but this generally happens at too late a period, for if they have not such fodder given them early in that season, and before bad weather takes place, they are very apt to get poor, weak, and unhealthy; and if the winter turns out long and severe, it frequently happens that very great losses take place in the flock. It is a good practice made use of in some places, to have spacious low buildings raised for them to run into at these seasons or any other times, for the purpose of getting fodder and protection, such places being kept constantly well littered down with clean wheat or other straw, and well supplied with food in proper racks fixed within them, so that the deer may never be in any sort of want. By means such as these, the young fawns are not only dropped in much better condition, but reared in far more perfection, and with considerably less loss, than where no attention of the sort is paid to the herd. The deer are, of course, larger, finer, and more free from the danger of being lost.

It is not unusual to have the young fawns, as they are dropped each year, marked in the ear or some other part, so as to know their age, varying the marks of each succeeding year, and entering them in a register kept for the purpose, by means of which, the ages of each may be readily and certainly determined when necessary. Such a register may easily be kept, as the mothers endeavour to conceal their young at first in some secret, lonely place of the park or other ground, among the cover of some sort of tall plants, as those of the shrub, fern, or weed kind; where they remain in a sort of imperfect concealment for a few days, until they have attained a proper degree of strength, and are able to follow the does. It is at this time that the males are castrated, and the females spayed; the former of which operations is performed somewhat differently as it may suit different intentions. At this period the greatest attention is required in the park-keeper, not only to discover the young fawns, but to perform these operations upon them when necessary. In the males these are the havers which afterwards are fattened for the purpose of venison.

It is also essential in raising deer, to attend well to the state of the fawns, as those which are produced late in the season, or from a young weakly doe, are seldom valuable for keeping. Such also, as are liable to have the skit, and to get low and weak in consequence of being the offspring of backward does, or from not being sufficiently fed at an early part of the winter months, are, in general, improper for being kept, as they rarely succeed well, or become good deer.

With all the sorts of young deer which are in any way improper for keeping, the following simple system of practice has been marked out, and put in force with much success and benefit by a distinguished nobleman, who pays much attention to rural improvements in the county of Hertford; and the utility and advantage of it cannot be less in other districts. As soon as the rutting season is over, which is usually pretty early in the month of November,

all such imperfect and enfeebled deer, as have been noticed, and which might be lost in the winter, in many cases, are selected and drawn from the herd, to be kept and fed in a small proper yard set apart for the purpose, which has a shed on one side, and a strong net over the whole, in order to guard against the ravages of pigeons and other voracious birds; the situation chosen being as warm and sheltered as possible. The place is then well littered, and kept so by some proper material, when the horns of the deer being sawn off, they are turned in, and there fed at but a very little expense, on such matters as pea-straw, hay, and the like, warmth making up for the want of better keep. At particular times during the winter months, they occasionally have clover hay cut into chaff given them, and when they do not eat it readily, as is sometimes the case, a little common salt is mixed with it. Water is constantly supplied in plenty, and the animals are kept perfectly clean in every respect. It is necessary that great attention should be paid by the keeper, who should make himself familiar to them, in order that he may enter the yard or place without causing them to be disturbed. In this way they are proceeded with and managed, until the first week in March, when they have oil-cake given them, in the proportion of about half a cake each in the day with cut chaff, which food is found to fatten them so quickly, that all of them are gone off in May. Before they are killed, they have some green food given them, with a view of taking away any bad flavour or effect which it may be supposed the cake may occasion, the venison proving unquestionably very fine and good. In these cases, the haunch weighs about twenty-four pounds; the brace being sold for fifteen guineas: the skin, which is worth two guineas, is considered the keeper's perquisite; so that the whole value of a brace, exclusive of some trifling articles, comes up to seventeen guineas. They are sent for by the purchaser, so that there is little trouble in the business. The quantity here usually fattened in this practice, is nine brace; the whole winter-stock rising to three hundred and fifty head in a park of two hundred and fifty acres, thickly set with timber in many parts. In other parks and places, the quantity that can be rendered fat under such a system must necessarily be various, according to the circumstances of the grounds and other matters.

There are openings in the fence of the yard or place of the fattening deer, through which they are shot when in the state to be killed.

In fattening the deer in parks and other grounds, in the grazing manner, they are found to do best where they are large and high, and the grass short and sweet, with plenty of wild thyme and other such plants, and browsing woods, as the flesh and fat are thereby rendered of a finer and better flavour. The best venison near the metropolis, is said to be that which is produced on and about the hilly parts in Hyde-Park, where the grass is remarkably fine and short, but the quantity is small and the value high. Deer, like sheep, feed in a close and clean manner, leaving little coarseness in the herbage where they pasture. By the use of much browse and bark of the parts of trees, as those of the ash, elm, alder, common fir, and some other kinds, by the deer, both the quality and flavour of the venison is greatly improved. By the same means, also, the quantity of hay in their winter keep may be much lessened, while the animals are preserved in better and more proper order for being afterwards fattened on the pastures. All

such branch woods, after they have been thus used, may be fagotted for further service.

The usual season for killing the bucks is from about the end of July, until the beginning of September, when they begin to rut or ramp: the proper time for killing the havers is from early in the month of September to the latter end of the following month; and that for the does, from the beginning of November until the end of the year. When killed, the deer, as the sheep, should be sent whole in the carcass for sale.

By careful attention in the management of deer, it would therefore seem that much improvement and advantage may be gained in several ways, and that they may be made in a considerable degree more generally useful than has hitherto commonly been the case.

Section IV.—*Diseases of Deer.*

The diseases of the deer are still fewer than those of either the sheep or the goat; and the former being more shy and wild, their disorders have been less attended to and remedied by means of art; the animals themselves chiefly relying upon the herbs and plants which they casually pick up in the pasture grounds which they inhabit for their cure or removal. They are, however, principally of the same nature with those of the goat, and may in general be remedied or removed by the same or similar means, when art becomes necessary.

SKIT.

In the skit, to which the late and more weak and feeble fawns are, in many cases, so particularly subject, and from which, in all probability, in consequence of the peculiar appearance with which it is attended, they have received their very extraordinary name, there would seem, in most instances, to be much neglect, as they are not unfrequently destroyed and lost.

It would appear to be simply a complaint that affects the bowels, and produces too frequent discharges of their contents, in consequence of the too great irritability and action of them, caused either by the rich juicy grass, when they first begin to eat it, in their then weak and very delicate states, or from the great debility that takes place from the want of being sufficiently fully and early fed in the winter time.

But from whatever cause it may arise, it is shewn to have taken place by frequent thin slimy dejections, that cause the appearance of much uneasiness, and produce a speedy decline and reduction in the strength and powers of the animals, with loss of inclination for food.

The fawns in such circumstances are, for the most part, killed, but they would probably be readily restored by such a medicine as that given below, where it can be used.

Take of—Mixture of burnt hartshorn, half a pint,
Chalk mixture, four ounces,
Tincture of rhubarb, two drachms,
Compound tincture of camphor, three drachms,
Treacle, half an ounce; mix and make them into a drink; of which a small tea-cupful may be given occasionally, as found necessary.

The fawn should be kept in a warm sheltered situation, which will much promote the removal of the complaint.

In the old deer, where they are attacked with bowel complaints, either of the loose scouring kind, or of the more constipated sort, which become fixed and continued for a length of time, it may be useful and proper to try the effects of such remedies, as have been advised for the cure of similar diseases in the goat, which will probably be found to answer perfectly in most cases where they can be given,

though hitherto scarcely any thing has been attempted to be done in the way of a cure for such complaints.

SECTION V. *Uses to which the several parts and products of the Deer are appropriated and applied.*

THE different matters and substances which are afforded by this animal, as in most others, are found highly useful in different intentions, and for different purposes.

FLESH.

This is very generally held in high estimation as an article of food, and, in consequence of its peculiar fine flavour, and being less plentiful than most other sorts, is commonly sold at a high price. The circumstances which principally contribute to the excellence of the flavour, and the goodness of such flesh or venison, have been already noticed to be, the nature of the situation and keep on which the animal has been raised and pastured or fed; but in order to be of the first quality, it must also have been made perfectly fat, as lean venison is never of much value. The haunches are the parts usually held in most esteem by the luxurious, but many other parts, though of less value, are equally excellent. The fleshy portions of several parts of the deer have particular names; thus the tail is called the *shingle;* the testicles, the *daruts;* the pluck, or race, the *humbles;* the tharm, or cleaned guts, the *hinch-pin*, &c. In preparing the fry, the palms, in the young horns, are, it is said, mixed with it, which, in the whole, forms a very excellent composition of that sort, as food. The flesh of the deer, in all cases, requires to be some time kept before it is used.

SUET.

The suet of this animal has been always very highly valued, for many different uses in medicinal applications, as well as in other ways; and it is capable of being made use of in the preparation of a number of different matters of other kinds, where a peculiarity of hardness and stiffness is requisite; as it is much more hard, and sets with more firmness, than the tallowy fat of many other sorts of animals, perhaps, indeed, more than that of any other whatever.

HORNS.

These serve a variety of uses and purposes in the forming of handles for different kinds of knives, and other large cutting instruments, as well as for several other manufacturing applications. They mostly sell at a high price, as sixpence, eight-pence, or more, the pound, when in good order. The velvety part of them, which is the flat top portion, known by the name of the palm, and which, as it becomes old, gradually hardens, is said, in its young growth, for six or eight weeks, to be fine for eating. When this velvety covering is lost, the buck is said to be *burnished*, and this usually happens early in the spring.

SKIN.

This is very valuable, but it is usually, though improperly, considered as the perquisite of the keepers. When properly taken care of, in the undressed state, it is worth from six or seven to twelve shillings, and much more, according to the quality. When newly taken off, such skins should be prepared, by having vegetable ashes thinly spread over them on the flesh side, and be then hung out to dry in a rather slow manner. The buck-skin, when completely finished and formed into leather, becomes of very great

value, being a very superior sort of leather for many purposes.

DUNG.

This has commonly, but probably very erroneously, been supposed to be of very little or no value at all as a manure. For, on a trial being made by the nobleman who has been already alluded to, in the view of ascertaining the point, three equal lands or ridges were manured and prepared for turnips; one with stable dung, one with deers' dung, and one without any manure whatever; the two manured were nearly equal; but, if any difference, it was in favour of the deers'-dunged part; the other was, of course, very inferior. Much good dung may be raised in the practice of confining and fattening deer with oil-cake and other proper substances, in yards or other places for the purpose, as has been seen, by having them constantly well littered with suitable matters of that kind, to be removed as they become converted into manure.

The parts and products of the deer, therefore, supply many useful purposes to man, though fewer than those of either the sheep or the goat.

Chapter V.—LIVE STOCK.

THE HORSE.

Section I.—*Nature, Use, and Character.*

This is an animal which is to be particularly noticed and considered, in speaking of improved live stock and cattle management, not only on account of its noble nature and properties, but also for its great usefulness, as without it, many of the comforts, conveniences, and improvements of society, must have remained nearly such as they were originally found; while the slavish labours of mankind would have been still much greater and more harassing than they now are in a variety of other ways, as well as those of cultivating the soil, and conveying its produce from place to place as wanted; for it is obvious, that neither oxen or any other sort of animals can perfectly supply the place of the horse to mankind, though they may occasionally, in some situations and circumstances, be had recourse to, with a certain degree of utility and convenience.

Writers on natural history describe and characterize the horse kind of animals as having, in the upper jaw, six fore teeth, erect and parallel; in the lower six, but more prominent; the tusks solitary, included, remote; teats two, inguinal.

APPELLATIVES, or PARTICULAR NAMES.

The young of the horse kind, while with the mare, is constantly called *foal*. To the young *male*, while sucking the mother, the title of *colt foal* is given; after that, when weaned, he is termed a *yearling colt*; then a *stoned*, or *two-year old colt*; next a *stoned*, or *three-year old colt*; and, when full grown, or four years old, a *stoned horse*, *perfect horse*, or *stallion*. When cut, castrated, or gelded, he has the name *colt* until four years old, after that a *gelding*, till he becomes six; and ever afterwards a *horse*.

To the young *female*, while sucking, the names of *mare* or *filly foal* are given; afterwards,

when weaned, a *yearling*, or *year old filly;* then a *two-year old filly;* after which, for the next year, a *three-year old filly;* and, at four, a *mare*, which she continues to hold ever afterwards.

In some places and countries, they are said to absurdly call *all* foals, while they continue in the state of sucking, *colts*.

The several parts of the horse are not unfrequently considered under the distinguishing terms of the *forehand*, the *body*, or *carcass*, and the *hindhand*. The *first*, comprising the head, neck, withers, breast, and fore legs; the *next*, embracing the back, ribs, belly, and shanks; and the *last*, comprehending the rump, tail, buttocks, thighs, hocks, stifle, and the rest of the legs.

TEETHING IN THE HORSE, AS SHEWING THE AGE.

The age of the horse, or length of time he has lived, may be known by his mouth, in examining his teeth, until he becomes eight years old, when the usual marks are mostly worn out. The teeth are generally forty in all; twenty-four of which are double, and, from their office, termed grinders; four corner ones, or tushes, and twelve fore ones. The first which show themselves are the foal teeth, which usually begin to appear in the course of one or two months after being foaled: they are in number twelve, six above and six below, being easily distinguished from those that come afterwards, by the smallness and the whiteness, resembling, in some measure, the *incisores*, or cutting teeth, in the human subject.

When from about two years and a half to three years old, the horse usually first sheds or casts the four middlemost teeth that he has got as above, two below and two above, which are succeeded by the same number of such as are much stronger and double in size, and when the whole of which are completed, he is considered three years old.

When from three and a half to four years of age, he casts four more, in the same manner, and when they are perfected, he is four years old.

Near the same time with these, or sometimes when full four years old, the tushes appear, which have sharp edges all round the tops on the different sides, the inner parts being somewhat grooved and flatted into a sort of hollow; they stand between the front teeth and the grinders, and are not fully formed and completed until the sixth year. In case these tushes do not shew themselves for some time after the first teeth have been cast, and the new ones come, it is mostly the consequence of their first teeth having been pulled out prematurely, to make the young horse of three years old seem to be four, as when such teeth are pulled out, they are soon replaced by others; but the tushes not being preceded by any, never appear until the proper time above-named, which clearly mark the horse to be four years old, by their smallness and sharpness on the tops and edges.

When from four and a half to five years old, the remaining four, which are termed the corner teeth, are renewed, and which at first are just equal with the gums, having the middle filled with a fleshy substance; they grow slowly, and rise but little, until the horse is five or rather more; they have, likewise, in some measure, from their appearance, the name of shell teeth, as forming the case of the middle flesh half way round, which, as they rise, disappears, leaving a distinct, open, hollowness on the inside. When the animal is fully five, they rise about the thickness of a crown piece. In half a year more, they become about a fourth of an inch in height; and when he is full six, nearly half an inch, and in large horses fully

that. The corner teeth in the upper jaw are lost before those in the under, and are seen sooner; while the tushes in the under, come out sooner than those in the upper.

After five, or when the horse is six years old, the hollowness on the inside of the teeth begins evidently to fill up, and what was at first a fleshy matter, becomes a brownish bean-eyed mark, which is just perceptible at five years old; at six, a new tush is seen surrounded by young flesh, having the point sharp, white, and small. At seven, the teeth are full grown, and the mark is seen with distinctness. At eight, the mark, if not wholly worn out, is scarcely to be seen, while the whole of the teeth are full, smooth, and even; the marks thus become gradually more and more faint in their colour, as the teeth are slowly filled up; and at nine they are wholly gone; when the tushes appear yellow and round in the points, instead of being sharp; and nothing further of the age can be known with certainty by the mouth. Afterwards, the longer the teeth are, and the narrower the under jaw about the extremity, the more the horse is advanced in age.

The eight first teeth, that the horse renews, perfect their growth in about fourteen days; the last four, and the corner teeth, probably, in not less than a year and a half. The first four teeth that are renewed are termed nippers, or gatherers; the next four, separators, or dividers; and the last four, the corner teeth, which have the bean-eyed black mark in them.

About the time the tushes are formed and are coming to their full growth, the horse is apt not to thrive so well, in consequence of the soreness felt in changing and getting them; and, of course, to be little stronger than one of two years old on that account.

In young horses, the bars of the mouth are always fleshy, and form so many distinct risings or ridges; whereas, in old ones, they are lean, dry, and smooth, with little or no risings. In young horses, also, the eye-pits are mostly filled up with flesh, and look full, plump, and smooth; while, in old ones, they are sunk and hollow, having an aged look. These circumstances and appearances, in the teething and age of horses, should be well attended to and kept in mind, being continually useful and necessary.

ORIGIN.

The horse is found, in the wild state, in the vast deserts of Great Tartary, in the more southern parts of Siberia, on the banks of the River Don, and in other parts of Asia and Africa. And in the domesticated state, as having arisen in the above way, this noble and generous animal is much attended to, cultivated, and improved, in most parts of the world.

FOREIGN KINDS, VARIETIES, OR SORTS.

In other nations and parts of the globe, as well as in this, there is a great difference in the sorts, qualities, sizes, and powers of the horses which are kept and made use of by the people who inhabit them, according to the nature of the soil of their lands, their situations, and their climates, as to heat or cold. In some, they are found of a good size, and tolerably well formed, with good action, being nimble and alert in their motions, and the modes of their going; many of them having other good qualities and properties of different kinds, with respect to temper, hardiness, bottom, and other matters. While, in others, they are met with of small dimensions, extremely bad and awkwardly formed in their different parts, with a stumbling unsafe gait, and very bad sluggish action. Much of this diversity of their qualities, probably, depends on the nature of their keep,

and the habits which they acquire in the different modes of training, which are had recourse to with them.

Arabia has been long distinguished for the excellence of its breed of horses, and it is from stallions of this sort that our most valuable breeds have been raised. In that country the horses are bred for sale, which, when they are sent out of it, raise a considerable revenue to the state. Registers of their parentage and alliances are regularly and exactly kept for a great length of time, as for ages; and it is, probably, by means of this correct knowledge of their pedigrees, that the value of them has been hitherto, and is still, preserved. By this means, too, the difference in the breeds is distinguished, the whole of them being divided into three sorts. The first, which is that which is the oldest and most pure, or free from any kind of mixture on the side of the sires and dams, is termed *noble;* the next, which is that which is constituted of such horses as have their race of great antiquity, but mixed with inferior blood, either on the male or female side, which is also considered *noble*, but mis-allied; and the last, which contains the common horses, of the country, which are sold at low prices, while the two former sorts are of high value, and are procured with more difficulty. Besides the above registers, in the first sort, certificates of the mares taking the horses, and of the former foaling, with the names of each, and their pedigrees, are likewise kept, and transmitted as vouchers with the animals when sold.

The horses of that country are mostly of a middling size; neat and clean in their shape as well as limbs, being rather thin and slender in their forms. They are kept well curried, and are fed twice in the day, having but small quantities of water as drink. As the spring season approaches, and the grass becomes strong and in plenty, they are kept by soiling; but when it is over, they are removed from the pastures, and kept without grass or hay, simply upon barley, with a determinate quantity of straw, for the remainder of the year.

The best and most useful breeds of the country are said to have been raised from the wild sort of the desert parts of it, from which, long ago, a stud was collected, which has increased the breed, and supplied most parts of Europe, as well as Asia, Africa, and some other portions of the globe, with horses, of this noble kind. Consequently, the most valuable sort of these horses are either directly or in a remote manner, descended from Barbs that have been derived from the Arabian breed, the soil and climate of which is peculiarly suitable to the breeding of such horses.

It is from stallions of this sort, as already noticed, that our best and most pure horse stock is raised, under careful management, in different respects, as will be seen hereafter.

Barbary propagates and promotes, with no small attention, the Arabian breed of horses, which are, in general, rather long and slender in the necks, and but thinly supplied with mane; they, however, rise in a distinct and bold manner out of their withers; their heads are lean and small; the ears are well placed, and rather handsome; the shoulders are light, flat, and slope well backwards; their withers fine, but standing rather high; the loins short and straight; their flanks and ribs full and round, without the barrel being too large: their haunches strong and elastic; but the croup frequently too long; the tail placed rather high; the thighs well rounded and turned; the legs clean and well formed, but thin of hair; the tendons of the muscles free from the bones, but the pastern commonly too long and bending; and the foot sound and

good. They are of most colours, but very commonly grey; rather slow and spiritless in their movements until roused, when they display much vigour, wind, and speed. Their action is light and nimble, being formed for the course; and there is more value attached to them on account of the offspring which they produce, than from their own merit, being supposed, in other countries, to afford a breed which excels themselves in goodness, from which they become of great value in the studs of many nations. Horses, of the Barbary sort, are met with in most European countries.

Those of the Morocco kingdom are in general thought to be the best sort of these horses; after which, the breed which has the name of the Mountain Barbs, which are sure-footed, gentle in their disposition, and very docile; having great freedom and boldness in their walk, and much rapidity in their gallop.

The Moors, also, are attentive to the propagating of the Arabian breed of horses, and take great care of them in their keep while rearing. They are likewise found among the negro tribes, on the banks of Gambia and Senegal, where they are often fed with bruised Indian corn, mixed up with milk into a sort of mash, which produces size and strength of constitution.

Turkey is supplied with the Arabian sort of horses, which there become strong and full of spirit, with a favourable safe action, but which are rather small in their size. They may afford improvement in the breeding of horses in other countries, in some respects, as will be seen hereafter.

In Egypt they have this sort of horses, but they have undergone little or no improvement in their size or other qualities, so as to render them of much utility to other countries.

Persia has the Arabian sort of horses, which are greatly altered by the goodness of the pastures, in most parts, and the fineness of its climate, being there rendered large and more bony, with a greater shew of blood. They may be employed in the breeding of horses in this and some other countries, for different purposes and intentions, with considerable utility. The breeds of horses met with in this country are in general deemed valuable in their different qualities.

The wild horses of South America are yet but little known and of small value; but it is not improbable, from the nature of that country and its favourable climate and pasturage, that it may have some breeds of an hardy active kind, which may be of great use in raising the horse-stock of other countries.

India, in the nature of its climate and the qualities of its soil, is, for the most part, unfriendly to the breeding and rearing of horses, which are there, in general, very small in their size, and sometimes but indifferently formed in other respects, having few good qualities, but a natural sort of viciousness. They are often fed with a small portion of hay in the day-time, with an occasional mixture of boiled peas, butter, and sugar, at night; sometimes in the rice-grounds; and when the flesh of animals is in abundance, with the waste parts of such food, much boiled, and formed into balls, with some sort of grain and butter, which are pushed down their throats. These sorts of keep do not, however, in many cases, raise them to any great value or utility.

In Tartary, the horses are but of moderate size, though strong, stately, full of spirit, active, and bold. They are suitable for the saddle, and have good action. In what is termed Little Tartary, a breed of these small horses is,

however, met with, which is so highly valued by the natives, as never to be suffered to pass into the hands of strangers in other countries.

Circassia, as well as Mingrelia, and the places in their vicinities, have horses, in great numbers, which are of better and juster forms and proportions than those of the above tract of country; and which, on these accounts, and their capability of undergoing the greatest labour and fatigue, are highly esteemed.

Russian horses are not held in much estimation by other countries; yet, though small in size, they are hardy, and equal to much labour and fatigue. However, where the Turkish breed is found to prevail, they are finely shaped, and handsome, though slight. Those among the Calmucks are rather higher than the common Russian sort, and are said to be so tough and strong, as to be enabled to travel a vast distance in a short time. They are constantly kept on grass, at all seasons, in the extensive deserts, where they collect in vast herds. They are admirable swimmers, readily passing rivers of very great breadth. The Nogay sort is a hardy breed, that belongs to that tribe of Tartars, and which is subject to the Kalmuck-khan. The Turcomans, situated near the Caspian sea, have horses of the same nature and properties. The Bashkir horses are still stouter and better, in different respects, than those of the Nogay tribe. Of the wild horse, which is that of the desert, there are three distinct kinds, all feeding together in large herds. The Russian horses, which are used by the Cossacks, are of great strength, and very hardy in their nature; but they possess little beauty of form, their heads being somewhat coarse and bony, their necks straight, their hips ragged, and their hams crooked, or standing too close to each other. Their legs are, however, clean and flat, with but little hair on their heels, so that they would seem to possess more blood than their external appearance displays. They may, therefore, be useful in raising and improving horse-stock, in some points, especially the stallions, in other nations and places. They have great activity, firmness, and nimbleness, in their step, and are quick in their walking pace.

Polish horses are extremely hardy and strong, though mostly only of the middling size. They are very useful for many purposes in breeding and in other ways, in such northern districts.

In Prussia, near the marshy parts of it, there is a breed of tall, strong, good horses, which have much resemblance to those raised in Friesland, though of inferior value. They may, perhaps, notwithstanding, be made use of with advantage, in some cases, as for instance, in breeding large, strong, team horses, and those for carriages.

Sweden has a low small breed of horses, of no great value for any purpose, either of the saddle or carriage.

In Denmark, and the districts of Holstein and Oldenburgh, there are a great variety of horses, which, though often deficient in elegance in the symmetry of their parts, and the shape of their limbs, have so much vigour, stateliness, courage, and showiness, that for the coach and some other such uses, they are excelled by few. Their foreheads are, however, thick, their shoulders heavy, backs long, and croups too narrow in proportion to the fore parts.

In some of the Isles of Ferroe, they have a race of horses which are small in their growth, but strong, swift, and sure of foot, travelling with ease and safety over high hilly situations. They are never in the habit of being shod, and they feed out of doors, without shelter, in the

winter as well as the summer. They are, however, too little subject to the rein to be made much use of in any way in other countries. In one other of these isles, there is a lighter and swifter breed than in any of the rest, which are useful in pursuing the sheep.

In Lapland the horses are small in size, but active and willing, being used only in the winter season, in drawing sledges over the frozen snow, and conveying wood and other necessaries. Their diminutive size renders them of little use to other countries for any purposes. In the summer season they are turned into the forests, and confined in distinct herds in their own situations.

Portugal horses were formerly much esteemed for their fleetness and long-windedness, but they have lately suffered much from neglect, and are greatly degenerated, being of no use to the judicious breeder of any country.

Spanish horses are mostly moderate in their sizes, and without strength, speed, or bottom. Their form is by no means good, having long heads, narrow fronts, small eyes, large, bony, prominent noses, small nostrils, thick leathery lips, confined jaws, thick throats, heavy fleshy necks, thick upright shoulders, small chests, short thin arms, long slight shanks, small joints, long sloping pasterns, narrow hoofs, flat ribs, hollow backs, short quarters, small round thighs, weak hocks, crooked hams, round croups, coarse bushy tails, stuck, as it were, into their rumps. Their gait or action bad in all respects. The Upper Andalusian breed is considered the best, but they are all unfit for the purposes of the careful breeder.

The Italian horses were, at a former period, much more famous than at present, and of a more beautiful form, though the country is not now without several breeds of considerable beauty in their forms, with other good qualities, dispersed in the studs of the different states and districts. The Neapolitan sort have constantly been famed for the saddle as well as the trace. Many are bred in Sicily, which has long been praised for the excellence of its horses.

In Sardinia and Corsica, the horses are small in size, yet bold, active, nimble, and full of spirit, but little useful to the breeder of other nations.

Swiss horses have something of the same nature and qualities, and were formerly accounted useful for several purposes; but they are now held in but little esteem for any use.

Germany is possessed of some tolerable horses for different uses, but they are considered as heavy, and badly winded; finer and better breeds have, however, been introduced from the Turkish and Barbary sorts, which are kept as stallions, as well as from the Italian sorts. They are inferior to many other sorts, wherever activity is required. The horses of some of the electorates or states of this empire, as those of Hungary and Bohemia, have no useful properties that particularly distinguish them for the benefit of the breeder.

The Hanoverian horses are of a good size, with a highish action; being generally fine in the forehand, but rather light in the ribs. They may be of great utility in raising horse-stock for different purposes in this as well as other countries, as will be shewn below.

Holland has a race of horses, which are chiefly useful for the coach, the best of which are brought from Friesland; but they have been little used in breeding in other countries.

The Flemish horses are much of the same nature and kind, but large in size, with big heads, large flat feet, legs thickish, heels apt to be affected with watery humours and swellings. They are found serviceable for giving

size and weight, as well as some other properties, in breeding.

France is possessed of different sorts of horses, but few which are of much excellence; the best, for the purposes of the saddle, are those brought from Limousin, which have some resemblance to the Barbary sort, but they are long in being fit for labour. Normandy has also an useful breed, and the lower district of that name, and that which adjoins it, afford a good sort for the coach, which are more nimble, and have better action than the Dutch sort. The common French horse is, however, a very inferior sort of animal. Such horses are of little use to the judicious breeders of this or other countries.

Section II.—*Different Breeds, Varieties, or Sorts, of this Country.*

The English horses of our times are of several sorts; but from their having been so much mixed and blended together, it is extremely difficult, or almost wholly impossible, to know all the distinct breeds. The better kinds of them are, however, commonly well formed, being strong, active, and nimble, with a great degree of courage, and capable of undergoing much fatigue, not being surpassed by any other sorts of horses in any other country whatever, especially in what relates to their perseverance and speed. This nation has, indeed, been very long distinguished for the excellence of its horses, and has been in possession of such breeds of them as are, for the most part, suitable to all its different purposes, whether of the turf, saddle, team, labour, or any other. By some persons, the breeds of horses have been considered as only two—the blood and the black cart kinds, but the sorts would seem to be evidently more numerous, as below; the whole of which may probably be conveniently distributed into two classes, the more swift, and the less speedy, kinds; the former comprehending the racing, hunting, and road, or hackney, breeds; and the latter, the light and heavy carriage and team breeds.

BLOOD OR RACE BREED.

This is the breed or sort which is of the highest blood, and from which many of the improvements in the raising of most kinds of horses have originated, and on which they must still depend. In it the animals have a peculiarity of form and shape, as well as other qualities, that distinguish them from all other sorts, and by which the action, spirit, pleasantness, strength, bottom, and other properties in horses may be given.

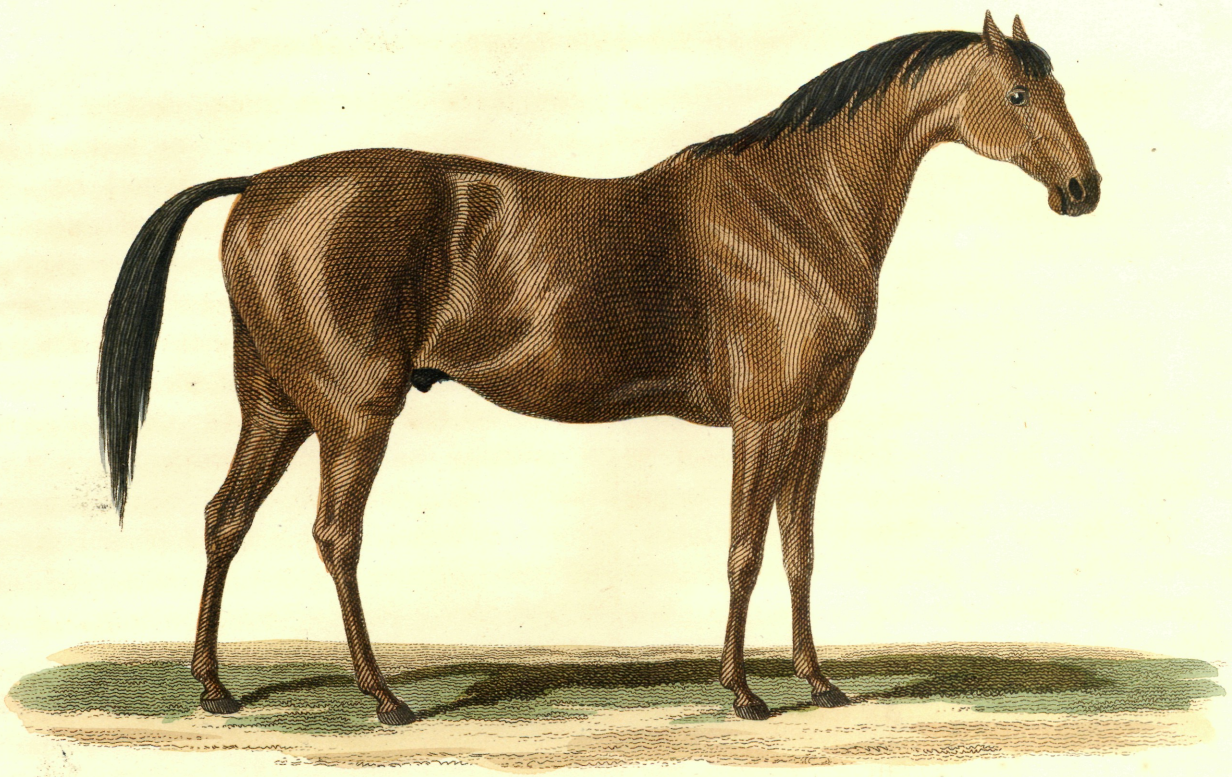
In this breed or sort, the forms of the several points or parts should be somewhat in this manner: the head well proportioned to the other parts, nostrils large and distended, muzzle fine, eye prominent, fier , and hewing resolution, ears small, upright, and fixed near together on the top part of the head: neck not too much risen, wind-pipe large and wide, at some distance from the jaws, and if expanded, as in the cock, not the worse; jaws of good width: the whole head so placed as to stand somewhat out, that when bridled, the animal may pull at full length, and not be drawn in to the breast too much; as in this way the wind is more easily got when at full speed. By the neck not being too high in these horses, some suppose they not only get their wind with less difficulty, but that they are stronger in the pull by the bridle, and, of course, in running, carry more weight in the mouth. This part of the horse is best when not too long; the withers very strong; the shoulders similarly strong, not too thin and fine, as most facilitating

speedy motion and strong exertion; the breast broad, so as to form a good chest; the arm, or fore thigh, powerfully muscular, and tapering down from the shoulder, with a strong, straight, sinewy insertion. The chest full, and deep in the girth; the ribs round, forming a circular body, without guttiness; the loin or fillet broad and rather rising; hucks standing in, round with the ribs, as tending to strength; the quarters long; the tail forming nearly a straight line with the back; the thigh strong and muscular, with length and straightness of the bone; the hind legs long and straight; the whole animal long below, and rather, comparatively, short above, so as to cover much space in moving; legs clean and flat; sinews firm and strong; hoofs round; heels wide and open; and the pastern or fetlock not too long, in order to prevent weakness. These are the essential points in horses of this breed; but some of them may be occasionally wanting, and yet the animals turn out well for the turf.

The great superiority of this breed of horses in this country has been, in all probability, justly supposed to depend on the particular attention, trouble, and careful management made use of in raising them for the purpose of running, as it has been so long and so uniformly kept up. Yet still some persons doubt whether the race breed at present be equal to what it was formerly; it being believed, not without some degree of reason, perhaps, that the custom, which now so much prevails, of racing them while so very young, has caused a slighter and less powerful breed to be produced than was formerly the case, as horses of the smaller and lighter kinds are well known to reach their strength and power far sooner than such as are of a larger make. Should this, on more full experience, turn out to be really the case, it will be an unfortunate circumstance, as it must have the effect of injuring the breed in its general utility in a greater or less degree; which is a mischief that can only be counteracted by attending well, in the raising of the full bred or blood horses, to large size and bone; a mode of proceeding which seems already to have been successfully begun in his majesty's stud at Hampton Court, and to be conducted and carried on with much judgment, persevering exertion and industry.

It has been justly observed, that as it is well ascertained that our best breed of these horses has been produced through Arabian stallions, it becomes a matter of some moment and consideration, whether a more frequent recurrence to a first cross from horses of that country, than is usually practised, would not be useful in respect to keeping up the original blood or kind. There is, however, a prevalent opinion, among those engaged on the turf, that the first cross from such stallions rarely answers the hopes of the breeder; and that as they breed for present use, few of them like to run the risk of the expense of waiting for the produce of the second cross. That such a notion may, in some measure, be founded in truth, there can be little doubt; when it is considered how very inferior the qualities in shape and action that are displayed by many of such horses as are introduced, as from that country, are, but which have, in fact, no real pretensions to such a distinction. That occasionally some excellent horses are brought from thence, there can be no question; but the difficulty, trouble, and expense of procuring them are so very considerable, that such importations are much less frequent than would otherwise be the case, and, consequently, other sorts are too often substituted. This fact should, of course, be well regarded in raising this breed of horses, and proper care taken to have the stallions that

BLOOD OR RACE BREED.



ARABIAN



HUNTING

London, Published by Thos Kelly, *17, Paternoster Row, June 1, 1822.*

are employed always of the true and genuine blood kind.

HUNTING, OR STRONG BLOOD BREED, OR SORT.

The necessity and importance of this breed of horses are principally occasioned, among other circumstances, by the changes which have taken place in the nature and manner of pursuing the chase. A swifter and stronger sort of horses have now become essential for keeping up with such sport; such a sort as are strong, and, in a great measure, full blood; as other kinds become, in general, quickly blown, and incapable of proceeding again; while those of the above quality readily recover, and become fit for the sport. It is, consequently, necessary, that the hunting horse should be as nearly as possible full blood, or quite so; provided he can have the proper strength and shape given him, but which union is difficult to effect, as the forms and qualities of the race horse and the hunter, in order to properly perform their different purposes, though both blood horses, must be perfectly distinct and different in their makes.

This sort of horse, under correct and judicious management, may contribute greatly to improve most of our riding and light carriage and team breeds.

In this breed, the make, in the several different points or parts, is, that the head be proportionally small; the nostrils large and open; the eyes quick and fiery; the ears properly small and sharp, standing rather close together; jaws wide; wind-pipe large; neck rising with a gentle easy curve from the shoulders, and being well and neatly attached to the head; the head fixed on inclining, so as to give a lightness in the hand in riding, and have a good mouth; higher before than behind by some inches in standing, and having the shoulders thrown into the back a foot and a half at least farther than where the point of the shoulder unites with the breast; the top part of the shoulder blades considerably short of the chine, and not too thin and fine upwards, but rather thick and well cast back in the shoulder, so as to keep the saddle well in its place, and serve the convenience and safety of the rider in all cases: the breast broad; the chest deep; and the ribs round, in order to keep the girths firm, and safe from slipping in either direction; the arm or fore thigh powerfully muscular, and tapering down from the shoulder, so as to terminate in a strong straight tendon or sinew; the leg bony and strong, somewhat thicker below the knee than in other parts, so that it may not project too much; hoof round: heel wide; pastern or fetlock short; little hair on the legs; foot standing straight with the toe of the hoof, but, if any turning, a little outward, not inward, as being more safe; the loin or fillet broad and straight; the body round, and firm in the carcass, but not out of proportion to the other parts, so as to be gutty; nor to have an over-weight above: the hucks lying well in, not raw hucked; the quarters long; the tail placed on straight with the back; the thighs full, strong, and muscular; the leg bones flat; the hind legs neither so long or straight, in proportion, as in the race breed; even when a little crooked, they have advantages in quick travelling on soft ground.

In going, the legs should approach near to each other, but not so as to cut, and nearer in the hind than fore legs, for the sake of strength, the latter following the former in an exact line of direction; rather shorter in proportion to carcass, in other parts; shorter backed, and covering more space below, in proportion, than the race-horse, yet not stepping out so far, when at full speed, but quicker

and shorter. These seem to be the most material points and particulars in horses of this breed that are deserving of attention.

ROAD, OR HACKNEY, BREED, OR SORT.

This is a breed which has less blood than either of the preceding ones; the full blood horses being generally improper for this purpose, as going low and unsafe in their slower paces. The proper road horse should probably neither be too slow or sluggish, nor too quick and rapid in its movements; as in the former case, there is much trouble and unpleasantness in getting it on, and in the latter, in consequence of the length of the strides, a looseness in the travelling in the slower paces, which is unpleasant to the rider, and to the animals themselves. Neither is a very quick motion to be supported for any great length of time, and, therefore, is but little useful. Consequently, if the road horse be capable of going, occasionally, at the rate of from eight to twelve miles in the hour, without any sort of inconvenience or unpleasantness, it may be sufficiently fast, and such horses be the most suitable for the purpose. In height, this sort of horse should probably be somewhat less than fifteen hands, to be the most generally serviceable; being of a firm and compact make, with more substantial solidity, in proportion to such height, than in either of the preceding sorts, so as to give more hardiness, and to require less stable management. Most of these horses have some proportion of blood, which renders them capable of greater exertion, and probably improves them in many other respects.

The make, in the different points or parts of this breed, should probably be much in this manner: head small in proportion, the nostrils large, and the eyes quick and vivid; ears short, sharp at the points, standing well upward, rather near together, on the top of the head, as it joins the neck; forehand rising; shoulder points thrown well into the back, the more below the chine the better; not too fine in the last, which denotes weakness; withers strong; fine in the pole, or behind the ears; back straight and flat; loin strong, and not too short, admitting the saddle well between the shoulder-blades and hucks, so as not to give too much pressure to either in carrying the rider, and thereby impeding the horse's motion; high in the ribs; round in the barrel; breast broad; deep chest, without guttiness, so as to carry the girths properly; straight in the hind quarter; close in the hucks, rather round and within the ribs; tail forming a line with the quarter; thick in the thigh and arm; rather short in the leg, with the bones flat, and short fetlocks; hoofs round; in the toes short; in the heels wide; when standing, the toes being all turned rather out, as giving safety and strength. In the gait, moving the legs as close as may be without cutting, as affording better support, and the steps short and quick, as less in danger of tiring, and more durable. The colour is not of much consequence. These are the points and matters that are perhaps the most to be regarded in this breed of horses.

In raising this kind of horses, those which are usually made use of for the purpose, are chiefly such as are found too inferior in size for the light carriage, and too much wanting in speed for the chase.

PONY, OR SMALL RIDING BREED, OR VARIETY.

There are several varieties or kinds of this small sort of horse, as the Welch, the Scotch, the Shetland, and the Fen, each of which are the produce of their particular situation.

WELCH PONY.

This is, on the whole, the most perfect and best of the whole of this sort of horses, being very superior in the feet and legs, and equal to any in travelling in hilly situations. It often prefers the stony tracts to those of the more soft kind, having much superiority over the fen variety, though raised on very dry, hard, and hilly land, worth little for any use, while the fen sort is the produce of land highly valuable. It is, in short, hardy and healthy, while that is just the contrary, strongly shewing the effects of circumstances and situations. Some believe that this is an original and distinct breed, which is not wholly improbable. but whether so or not, it must be regarded as an active useful sort of little horse for many purposes.

It is distinguished by the following points and particulars: small in size, not more than about twelve hands in height; make in carcass short; head small; flattish in the nose; ears sharp and small; neck somewhat short; in withers strong and well raised; carcass round and deep; breast broad; shoulders usually tolerably well thrown into the back; legs short-jointed, well-made, and flat; hoofs tough, round, and good; in the heel wide; and short in the toe, when well attended to. The colour is various.

SCOTCH PONY.

This is not a large, but strong and hardy, sort of horse of the kind, which is sometimes rather coarse in the make, and slow in the gait, but canters well and with great ease, getting over a large space of ground in a persevering manner, and living on inferior keep, in proportion to other horses of the same dimensions, without any disposition to get too fat. In height, the horses of this sort or variety are from twelve to thirteen hands, or a little more. Some think them rather well and strongly formed, both for labour and activity. There are some horses of this kind which might probably be greatly improved, by letting the mares take strong stallions of the heavier, good, team kinds, so as to better the size and action. Some, also, are of opinion, that if horses of this kind could be raised to the size of those of the dray sort, they would be highly valuable.

The characterizing points and peculiarities in this sort of horses are, that the head is rather large; the neck somewhat short; the shoulder standing rather forward; somewhat low before; in the back rather long, with strength; in the rump short; tail set on low; legs and feet very good; leg bone rather round, though large, and the pastern or fetlock short, with good, firm, tough hoofs. The colour mostly grey, but sometimes black. They are said to be firm, sinewy, and of great muscular strength, with an eye that displays health, soundness, and spirit. They are mostly found in and about the borders of the Highlands.

SHETLAND PONY.

This is a very small sort of this kind of horses, seldom reaching more than about eight and a half or nine hands high, but in the make rather beautiful, being well adapted for the saddle in carrying light weights, and for light purposes of draught in pleasure-grounds, but wholly unfit for any sort of tillage labour. They are disposed to thrive well, being even more hardy than the ass or mule. They are commonly met with as above, and in the Orkney, Caithness, and other western islands of Scotland.

This is a kind of this sort of horses which is marked by these points and particulars: small in the head; short in the ear; neck not

long; shoulders thick, and rather low in the fore part; in the back short and strong; quarters round; a roundness in the hucks; very great strength in thighs and arms, in proportion to size; legs very good and handsome; small in the pastern; and the feet round and small. The colour in general brown or black, very hairy, with the tails and manes of great length.

FEN PONY

This is a sort of horse of this description, which has been reared for a vast length of time on the Wildmoore fens, in the county of Lincoln, which were undoubtedly destined for a far higher use, and to which they are now appropriated; and, in consequence of their enclosure, this very inferior race of horses must, in a great measure, be destroyed. On account of their very indifferent qualities, they have been chiefly applied to very inferior purposes in riding, and are become only of very trifling value, being greatly subject to diseases of the bowel insect kind. The loss of them is, consequently, little to be regretted; and it must have been the height of folly to have so long raised such a sort of horses on such excellent land.

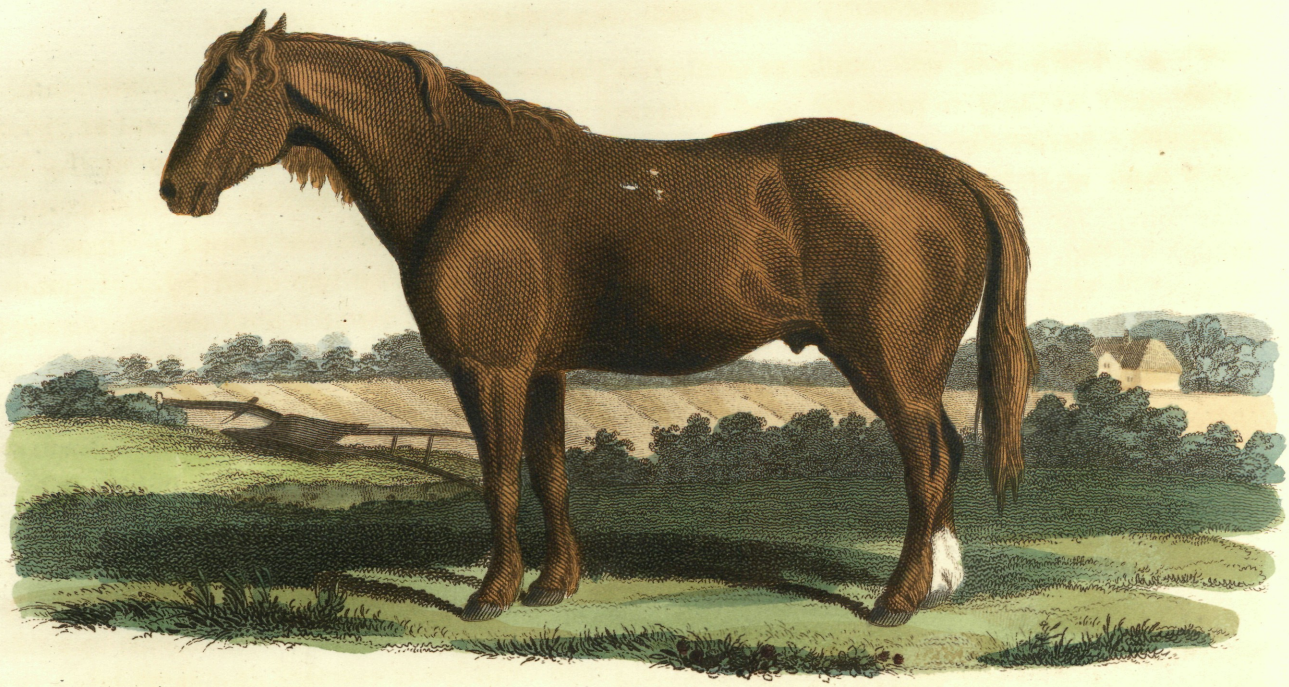
The points and qualities which are peculiar to this sort of horses are, that the height is commonly below thirteen hands; make crooked; head large; neck and fore-hand low; sides flat; in the back long; hind quarters short; forward in the shoulder; tail set on low; legs flat and good; pastern, or fetlock, short; the tread often too low, from length of toe; hoof naturally round, but sometimes flat, and the frog occasionally becoming higher than the heels; the colour of most kinds; and the travelling tolerable on flat soft tracts, but very indifferent on the hard, flinty, and hilly sorts. On the whole, the animal is of a very indifferent kind.

The breeds of the light and heavy carriage and team kinds are these:

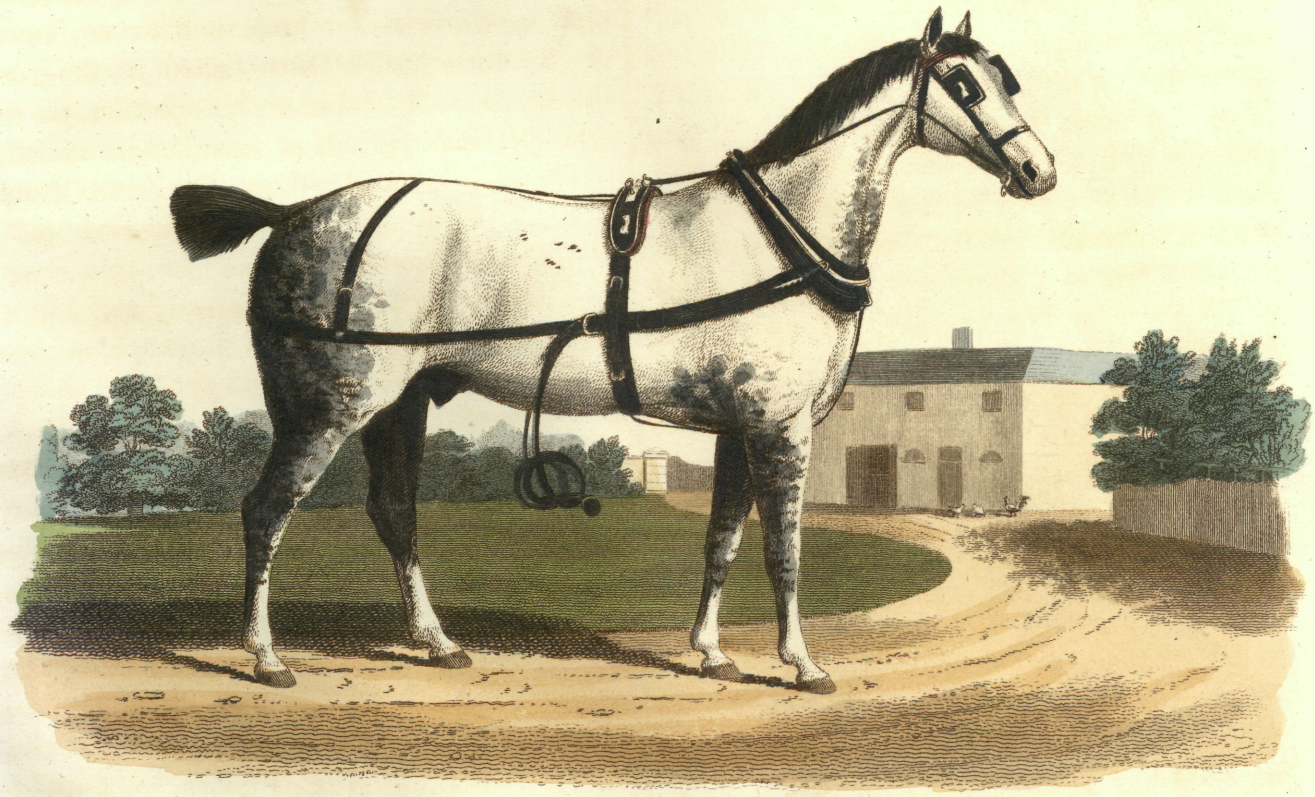
CLEVELAND BAY, OR COACH BREED OR SORT.

This is a kind of carriage horse, which was formerly held in great esteem, in consequence of its large size and shewy appearance; but which has lately much given way to horses of smaller stature, with better action and more blood; which, for all light purposes of such kinds, are probably far better suited, especially where there is sufficient strength combined with such excellence of breed, however near full blood they may approach. For though these large bay horses have much make and shape in their favour, yet, from the faultiness in their legs and feet, whatever their appearance may be, or the action they display, they are, unquestionably, very remote from being horses of good movement, having much more show than fitness for travelling on the roads, where they soon become tired, dragging themselves in a very awkward, unpleasant, and distressing manner. The nature of the form in these large unwieldy carriage horses has the tendency, also, of causing them to stumble, as from their length of leg and load of carcass, they must, of necessity, be too weighty above, and, of course, want that activity and nimbleness, for expert, light, quick action, which, in such animals, tends so much to keep them on their feet, by preserving the legs much under them, and thus avoiding the danger of false steps and consequent accidents. By the substituting horses with more blood, in the place of these, more expedition, power, and perseverance, has been produced, which are vast advantages; and the great utility and necessity of breed has thus been shown, as though keep will effect much, it will not prevent bad action, afford bottom, or correct faults in the feet and legs.

LIGHT TEAM BREEDS.



PLOUGH.



CARRIAGE.

London, Published by Thos. Kelly, *17, Paternoster Row, June 1, 1822.*

This sort of horses, with stallions of the full blood kind, is said to produce good hunters and saddle horses; and with those of the half bred sorts, useful carriage and team horses, that move quick, and bear great exertion. Horses of this sort are chiefly produced in Yorkshire, and some other more northern counties.

The most material points and particulars that serve to distinguish this sort of horses are, that the colour is mostly bright or brown bay, having the tail and mane commonly black; the size large, as up to seventeen hands in height; in the best sort, the upper parts well formed; carcass good, with lofty aspect; high in forehand; shoulders lying well in the back; head somewhat large; ears long and upright, standing rather near together; legs and feet indifferent, the former round, and disposed to swell in standing; hoofs steep or erect; short in the fetlock, but the knee often projecting before the foot and hoof, and producing weakness in the legs, and disposition to tire; and bad in travelling. They are, however, considered strong and hardy.

SUFFOLK PUNCH, OR TILLAGE BREED OR SORT.

This is a sort of horse which, in some places, has been greatly extolled for every purpose in the tillage working of the soil, and is considered more valuable than many others of a similar nature, bulk, and movement; but as it is only an ordinary sort of horse on the whole, its utility and value may probably rest more upon its great hardiness than any thing else. In height, it is usually about fifteen hands, or a little more, with but a very middling kind of make, being merely suited for team-work, but wholly improper for the higher uses of the carriage, or those where good action and appearance are necessary. Nor does it seem, when the work is nicely examined and attended to, to have any very great superiority in the performance of the tillage of the field over some other sorts. It is not, however, improbable, but that the breed of these horses might be greatly improved by the judicious use of stallions, which have the proper degree of figure, blood, and strength, as the bulk would not be lessened, while it would gain the advantages of better form, agility, speed, and bottom. This sort of horses prevail most in some parts of the county of Suffolk.

The particular distinguishing points and marks in this sort of horses are, that the colour is mostly yellowish or sorrel, having a white rach or blaze in the face; the head large; ears wide and somewhat plain; muzzle coarse; in fore-end low; back long, but straight; flat on the sides; shoulders much forward, and rather thick above; breasts sometimes a little narrow; hind quarters rather large and strong, sometimes a little high at hips; good in the hind thigh; arms in tolerable proportion to the other extremities; legs round, and short in the pasterns; deep bellied; full in the flank; and size not large. The belly being gutty, without sufficient breadth and strength above, and the loins weak and narrow, are bad in team animals, as they have always to bear much stress in working.

CLYDESDALE, OR SCOTCH TILLAGE, BREED OR SORT.

This is a sort of horses which has been found to answer well in tillage teams in the more northern hilly districts of this country; and which is steady, strong, active, and hardy, being remarkable for its truth of draught. It is said to have been the production of Scotch mares, by stallions of the Flemish kind, which were brought thither by some of the Dukes of

Hamilton, towards the close of the seventeenth century, and put to the best mares of the sort found in the Lanark district, in Scotland. Many parts of that as well as this country, have this sort of horses for team purposes, and likewise for those of the carriage and saddle. It is usually from fifteen to sixteen hands high, or rather more.

The main points and circumstances of distinction in this sort of horses are, that the colour is almost always grey or brown; the body lighter, more elegantly and better formed in every respect, than in the Suffolk punch; the head of a finer form; the neck longer; the eyes more sprightly and animated; the limbs clean and sinewy; the step or tread firm, and inclining to the nimble; muscular strength very great, when suddenly exerted, as necessary in hilly situations; very hardy in the keep, so as to live on any sort of food; the most thrifty for the cart or plough of any that can perhaps be met with; in temper even; in the movement steady; and, in size, neither so large or unwieldy as to burthen the soil. This sort of horse requires to be better known in tillage management.

GARRON, OR OLD SCOTCH BREED, OR SORT.

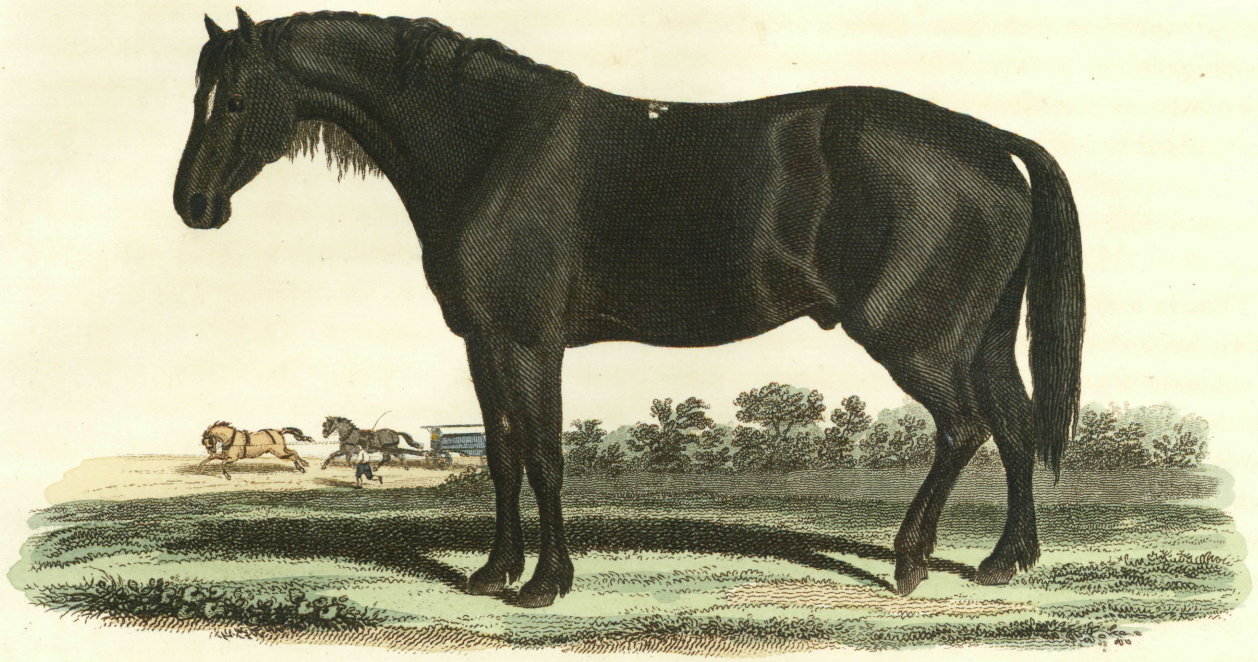
This is said to be the ancient breed of the country, unimproved by being crossed with other sorts. This kind of horses are still commonly met with in the cultivated tracts, which are in the vicinity of the mountains, and that are the least improved by the modern practices. They are a strong hardy breed, which are somewhat under the middle size, and which partake more of the form or shape of the Suffolk-punch kind, than of the clean-boned, fine-made, Cleveland-bay sort. In height, they measure about fourteen or fifteen hands and a half; and probably, by proper care and attention in improving them, might be rendered a very useful and valuable breed for different uses and purposes in tillage and other sorts of light team labour, *&c.*

GALLOWAY SCOTCH BREED OR SORT.

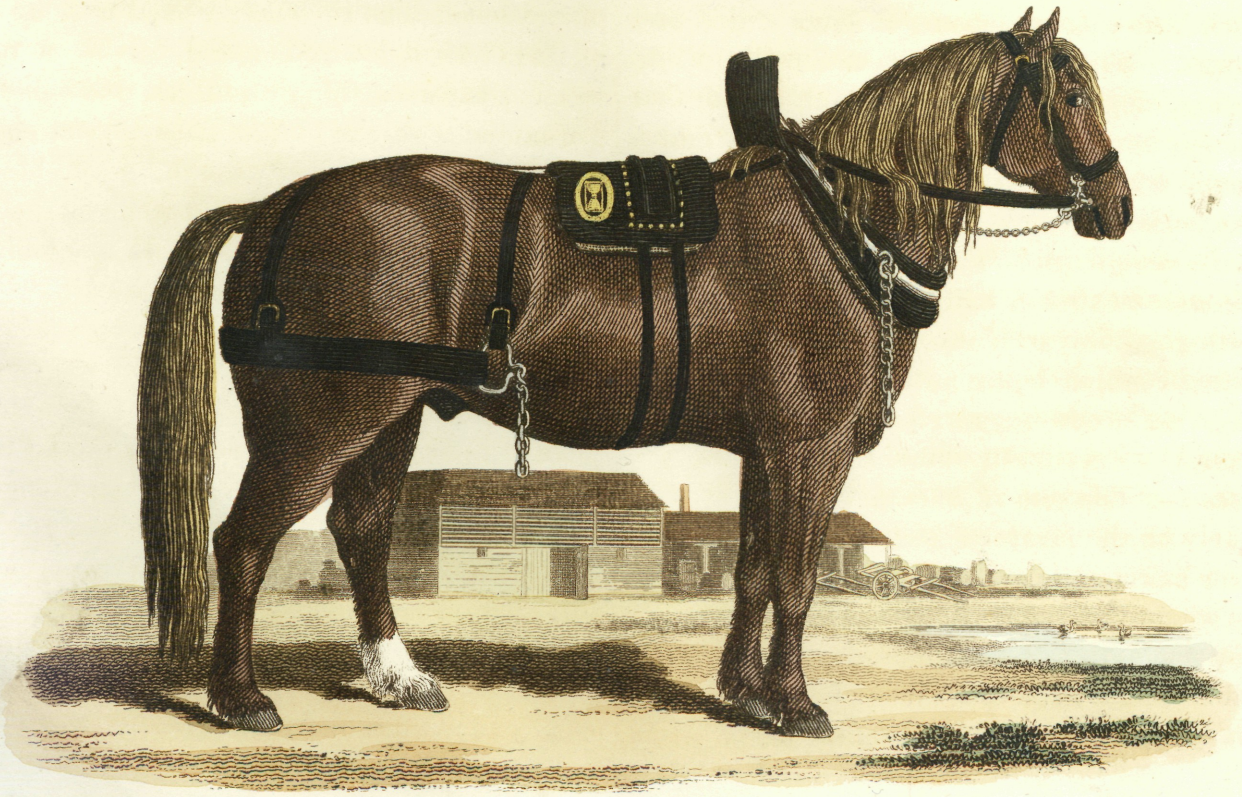
This is a breed or sort of horses, which are much superior in shape, and lighter in the bone, than the Garron kind, but nearly about the same measure in their height. They are asserted to be very well suited for the road or travelling, as they have good action, or move readily, and at the same time are capable of enduring very great fatigue; which superiority is supposed to have arisen from the circumstance of some stallions having been thrown ashore in the neighbourhood of this district, in consequence of the wreck of the Spanish Armada, and which, having been crossed with the mares of the country thereabouts, produced the breed so well known under this name; but which, for want of attention, has now considerably degenerated in several respects. It is, indeed, asserted, that this breed is now nearly extinct in that country, which is to be much regretted, as could a sufficient number of them be collected, so as to make a proper selection from them, for the purpose of raising stock, it is impossible to say to what height of perfection they might in time be brought. A single judicious cross would probably improve their size, without much lessening the other good qualities they possessed. A cross between these and the Clydesdale sort would, it is believed, be excellent for many uses, especially those of the tillage kind, in such a district.

In the island of Mull, to the west, it is believed, some remains of the breed are still to be met with, though they are under such neglect, as to be fast degenerating by the inter-

HEAVY TEAM BREEDS.



CART, WAGGON & TILLAGE.



DRAY.

London, Published by Thos. Kelly, 17, *Paternoster Row, June 1, 1822.*

mixture with other inferior breeds or sorts, as just suggested.

For the other Scotch breeds, look to the head, *Pony*.

BLACK DRAY, WAGGON, MILITARY, AND TILLAGE, BREED OR SORT.

This is a fine noble-looking sort of horse, when kept in perfect condition. In colour, it is commonly a fine bright black, having some white on the face and legs, being large in the make, with a great deal of bone, the mane and tail of much length, with long hair on the legs. In some of the districts in which they are chiefly produced and raised, they rise early to a large size, as nearly or fully seventeen hands, before they are three years old, being equally well grown in the body parts. But in other parts of the country they cannot be reared or grown to such sizes or bulks. These horses may be considered as very useful for working in drays, coal waggons, and other such heavy team labour, in large cities and towns. They are also, occasionally, while young, employed in tillage labour, but for that employment they want better action and movement, which would not be disadvantageous in the heavier teams. These with some other faults would probably be removed, by having recourse to strong, active, full-blood stallions, with good dray or black mares, the female produce of which being put to dray stallions, an offspring would be gained in the males, which would be excellently suited for improving the breed of this sort of horses, as it would most likely be the means of causing the loss of the over hairiness in the legs, while there would be a gain of action, wind, and courage, without any diminution of size or strength. How far other simple or more compounded trials in this way might be beneficial, in different views, is difficult to say, as none or very few attempts have yet been made.

In propagating by some different horses with the dray kind, varieties of other colours, equal in size to those of the dray sort, have been gained, especially the grey, so much used by the brewers. The smaller kinds of these horses are used in the lighter teams, and as military horses. The midland counties and Lincolnshire are the principal places where they are produced.

The principal points and particulars which should distinguish this sort of horse are, that the breast be broad; shoulders thickish and rather upright, not too much thrown into the back; blade-bones substantial, and nearly the height of the chine, to give firmness to the collar; neck not too long; head not too large or small; eyes bright; forehand low, to give steadiness in drawing; back broad and not too long; broad loin, of good height, as giving strength; quarters broad and cloven; hucks placed lower than the ribs; ribbed well up to hucks; ribs deep and round, giving a full weighty carcass; thigh very thick, and equally substantial with the hucks; arms very strong; legs rather short; round, tough, good, black hoofs; wide heels; legs without white on them; and not rising too much in the pole, as tending to produce the disease affecting that part.

The sorts or varieties of these horses, which are made use of on the roads for stage waggons, and other such purposes, while the form and make of their several points or parts should be, in a great measure, the same, as greater length of time is necessary before they become ready to be employed in such ways, they are generally such as are rather too small for the use of the brewer, or other similar purposes. They should, however, have an improved action, and more expeditious movement, as that would

render them greatly more useful in travelling the road, even if but increased in a slight degree; which might probably be effected without any very great difficulty, by the careful and judicious use of fuller blood stallions, of proper size and strength in the producing of them.

Those for military and tillage purposes, are such as are still less in size and weight; but in the former of which, the action and alertness should be a great deal more; and in the latter, the step more quick and extended, as by such properties they would become much more valuable for both such purposes.

These are the different breeds, varieties, or sorts, of horses, from which all the several kinds for different uses and purposes are raised in this country; as by uniting or combining the full-blood Arabian or Barb with good mares that have been raised in the same way here, the race or full-blood breed is produced; by connecting the strong and powerful blood horse with the half-bred mare, the hunting horse or breed, as well as the hackney, is gained; by joining this last sort of horse, or hunter, with mares of the more common strong kinds, the coach-horse or breed is provided; by putting the hunting horse to the still stronger and more bulky mares, or those which have the most power, the dray, heavy, draught, and team horse or breed is afforded; and by mixing and blending different sorts of horses, with mares of the several kinds indiscriminately, a mixed uncertain description of horses is the result, as may often be seen in our common horses.

Section III.—*The Horse, Stallion, or Male.*

The horse, or stallion, which is made use of in the raising of such young stock, should always be as free as possible from all sorts of hereditary faults and defects, whether in his body, head, eyes, legs, feet, or any other important part. In the weight of the body, there should be nothing of superfluity in any way; the head, too, as being material, should be light and well formed, so as to be perfectly suitable; the wind and eyes quite sound; the legs and feet naturally good, and void of blemishes, as without this, any other good qualities are of but little avail. The temper or disposition should be mild and gentle, as in viciousness of any sort there is constantly danger and disadvantage. With these there should be a proper boldness, spirit, and strength of constitution, as being the most favourable to the production of good offspring. The stallion should, in fact, e always provided, so as to have the properties and suit the nature and kind of improvement or sort of horse which is particularly required to be raised, being possessed of the peculiarity of form, in the several points or parts, which are essentially necessary for the purpose. By the forms of the horse and the mare agreeing as much as possible in this way, their joint properties and excellencies may be more rationally supposed to take place in the young produce which they afford, than by violent crossing contrary to nature. Thus if a large, heavy, awkward, ill-formed cart-horse, were put to a half-bred mare, or the contrary, the offspring would naturally be found to be an indifferent mongrel breed, with but rarely either the size and strength of the one, or the spirit, activity, and fine bone of the other.

The means of providing good suitable stallions, in different intentions, are not sufficiently attended to and facilitated; but difficulties are thrown in the way from various causes. The too prevailing practice of cutting or castrating such numbers of horses, has the effect of leaving too few stallions, and, consequently, of lessening the choice, and the possibility of

such proper selection, as very excellent horses for the purpose are constantly seen thus mutilated and spoiled. The greater part of such stallions as are led about from town to town, and market to market, are in general very improper for the purpose, as being badly formed, and of a very mixed nature, and rendered extremely fat with a view of hiding their faults and imperfections, which are commonly overlooked by those who care little about their kinds, and still less about their forms and qualities. They usually cover cheaply, which is the chief object the raisers of such stock have in view; whereas the price ought to be rather high, in order to render it worth while to keep stallions of the proper kinds, so as to raise valuable stock. By the lowness of the price, too, such horses have often more mares to cover than they ought, which is not unfrequently the cause of a weak, feeble, and too small-sized stock being produced. Large-sized stallions are too much regarded, in the absurd notion, that their produce will make up, by their increased dimensions, for any faults, defects, or natural blemishes, which they may have; but good, well-made, compact horses, which are bulky in a small compass, are ever to be preferred as stallions.

It has been a favourable proceeding with different societies, formed for the purpose of promoting rural practices and improvements, to endeavour to induce the raising and providing of the best and most proper cart and team stallions, by giving premiums as rewards; and which, though they have not always been bestowed with judgment and propriety, have been of much service in promoting a better attention to the matter, and in exciting a greater degree of emulation in the business; and which, if well directed, would be greatly beneficial in its consequences. And, if the same mode was generally had recourse to, as is the case in some places, in respect to stallions of the saddle kind, it would have the tendency of forming a more extended and important improvement, in the selecting of proper horse-stock for propagating from, than almost any other measure that could be adopted; as by drawing into a sort of focus the whole of the stallions of a district, under such an inspection, it would be the means of a more close and nice examination and comparison of their different perfections and defects, and of deciding upon the propriety of their use in a better manner.

It is, probably, in all cases, the most proper and beneficial practice, to raise horse-stock from stallions that are the best and most valuable of their kind, as horses which are well descended have very great advantages over others in such uses. The best race stallions are always such as have been the most highly proved, or of the first-rate kind, having proper size and strength. The country stallions, that are of a blood sort, are often so formed, especially in their legs, and with such bad action, as to be very improper for raising road horses from; the proper stallion for which purpose is, the well and suitably made, half-bred sort, which has a free and light movement, but which is rarely to be met with; a circumstance greatly to be regretted, and which arises from the very wrong notion of its being improper for raising stock from. This error should, therefore, be corrected, and such horses be more regarded as stallions, with the view of producing good road horses.

In some states on the Continent, the raising of good horse-stock is considered a matter of such importance, that the provision of stallions for the different districts is undertaken by government; and such a measure, when well regulated and directed, must be greatly beneficial.

In raising young stallions, care must be taken, that they are constantly as well kept as possible, in order that they may reach their proper growth in the best and most favourable manner. It is always a very ill-judged parsimony, to be too sparing in the proper sorts of food for these young horses, as good keep is, perhaps, never so fully paid for in any other way, and the contrary practice is ever the loss of those who adopt it.

The proper age at which the stallion is considered in the fit state for producing good young stock, is usually from about two to three years old; and some breeders think, that the first of these periods is as suitable as any other future one; but it may often be better, as being less injurious to the constitution, to have it deferred till the latter. From such ages the stallion may mostly continue in sufficient vigour, and be suffered to procreate until a much more advanced state than is commonly supposed, without any difference whatever in the goodness or value of the offspring. This is too fully established, by numerous facts and proofs, to be in any way disputed. It is sometimes the case, that such stallions as are slow coverers, have different substances of the stimulant rich kind given them, in order to increase their vigour, but such practices can be of but very little utility.

It is always proper that stallions should be kept, with the best sorts of food, in a high state of condition, and that they should be well dressed and taken care of in the most exact manner, as without such attention and management they can never have that success which would otherwise attend them.

Section IV.—*The Mare, or Female.*

The mare, like the horse, for the purpose of raising stock from, should, in every case, be provided as clear as possible from all kinds of inherent natural defects, faults, and lamenesses, as though the produce she may afford may occasionally, for a time, escape having any of them, some of them will make their appearance in the successions at a more or less remote future period. The practice, therefore, of keeping mares which are lame, or otherwise faulty and incapable of being disposed of, with this intention, is highly wrong, as perfect stock can rarely be expected from them, though such practice is far too frequent with many, who are in the line of providing such young stock.

Mares, for this purpose, should invariably be selected with a nice and exact attention to their properties and qualities, their proprieties of form, and their soundness and freeness from vicious habits and blemishes of every sort; being, in all cases, carefully suited in their nature and kinds to the particular uses and views for which they are designed. The custom of making use of such mares, as may be accidentally at hand, which is much too general, should never be resorted to, as it must almost always be improper and injurious in the raising good stock of this kind. Mares, for such purposes, should always have, as near as possible, the proper and necessary shape in all their different parts; be of gentle, tractable, and easy dispositions; be provided with large carcasses, in proportion to their heights or sizes; having their bellies pretty full and distended, so as to show the likelihood of their making good nurses, and having plenty of milk; and their constitutions should be healthy and vigorous, and quite free from any sort of taint. These last points are highly and particularly important, as much of the future goodness and advantage of the produce depends on the soundness and healthiness of the parent stock

from which it is raised. And, as general experience has shewn, that at least as much, if not more, depends on the mare as the horse, in regard to whatever relates to the propriety and justness of form or shape, as well as the other good qualities, of the young offspring, the too common practice of regarding the horse more than the mare, is quite wrong, as both are constantly to be well attended to, with a view to raising good horse stock of every kind.

The mare is generally considered to have the most proper shape for raising the best offspring when rather lengthy in the carcass, most probably in consequence of mares so formed being commonly the best nurses and milkers. But, besides these requisites in mares, much attention is necessary to the nature and form of their legs and feet; for, unless these be proper and good, whatever their shape in other respects may be, they are wholly unfit for this use, as large mares, which are too weighty above, with the legs small and long, are constantly bad and improper. The legs being well formed, and short in proper proportion, with good sound feet, with proper round strong hoofs and strong wide heels, are perhaps, in general, the most suitable for this purpose.

Young mares, like the horses, should be well kept and managed, at all times, while in their growth, and until completely raised to their proper state.

Mares are in a state to produce young from the age of one to two years old; but they are rarely suffered to take the horse, in this country, before they are from two and a-half to three or more years old. Mares, at even either of these ages, generally produce smaller and less perfect stock than at a more mature and advanced period. This may, in some cases, arise in consequence of their being then about changing their teeth, which may affect their milking, and render them less able to supply the wants of their young. It is, therefore, more proper, in most cases, to defer the business until they are four years old, as then there will be no risk in any way. Mares may be kept in the productive state, without any sort of disadvantage in their produce, until they reach a much more advanced age than is commonly believed, namely, to twenty years or more; but the usual time is about ten or twelve, which is perhaps the most proper, as, when kept too long in that state, as is often done in race-horses, it is doubtful whether the produce be so strong, healthy, and vigorous, as that produced by young mares. In mares that are very much advanced in age there is often a difficulty in pasture feeding, in consequence of their teeth, which renders it necessary for them to have other food; on account of which their means of properly supplying their produce with nourishment must be considerably lessened, and they be less suitable for raising stock from.

The proper season for the mare taking the horse, or being covered, must, in some measure, depend on the nature and circumstances of the situation; as where these are warm and forward it may be more early than where they are cold and backward, as there should be plenty of proper juicy keep for the mares ready before the young animals are brought forth, as dry food in the house is by no means so favourable for milk, or so suitable to the nature and habits of the mares and foals. Therefore, about the latter end of April, or early in the following month, may be sufficiently in time for the purpose, either in the racing or any other kinds, and continued till towards the end of June, if there be a necessity, which some breeders think to be generally the best season for the purpose. Too early produce of this

sort generally look poor, thin, and stunted, for want of proper keep. Properly early foals, are, however, always to be preferred to such as are more late. In raising the race sort, there is an advantage in the age by having the foals produced in the later winter months, as a half year is gained, that being always reckoned from the month of May. By such means, however, the habits of nature are little attended to or consulted, as the mares must then be much less provided with milk, than when the season is finer and the grass rising in plenty; and, of course, the young produce will be raised with greater difficulty and hazard on that account, as well as from the milk wanting the necessary opening quality, which is not unfrequently attended with the worst consequences to the young animals.

For mares which have their produce sucking them, the proper and most usual time for taking the horse is from nine to about eleven days, so as not to exceed the last, from the day of dropping their foals; as they are almost regularly in season in that space of time. When, however, by any means this is not the case, the consequence often is, that they do not stand the covering; they are sometimes tried again in the space of nine days more; but, as such a proceeding may be liable to cause them to slip their stintings, it is a better way to defer such trials for the course of about three weeks; when, if they do not stand to the covering, some blood is taken from them as soon as they have again had the horse, which is supposed to be useful in preventing such consequences. The propriety of this practice of putting mares to the horse so early has, however, been doubted by some, as the keeping of foals by their sides, and the having of others to support within them at the same time, must be exacting too much from the mares, and it is reasonable to conclude that either one or both must sustain injury, in consequence of the portion of proper nourishment being thus divided. But, since the mares shew a natural desire for the horse so immediately after having their young, it may be rationally suspected that such would not have taken place if there had not been the means of properly supporting both; it must be proper and prudent, however, with old mares, to allow a suitable length of time to elapse, (such as eight, ten, or even twelve, months,) before they have the horse, as they must of necessity have much less force and power in their constitutions, than such as are younger and less worn out.

It is commonly believed, that the mare has conceived when no further desire for the horse is shewn; but the matter is seldom perfectly ascertained until five or six months have elapsed, when, by carefully attending to her flanks at the instant she has drank plentifully of water, sudden jerks and movements may occasionally be seen, which denote the presence of the foal.

The length of time that the mare goes with foal is not more certain than with other animals; but it is usually from about eleven to twelve months. Such mares are, in some cases, not worked at all, or taken wholly from it for some weeks before the time of foaling; but these are not by any means the general practices,—as, in the midland districts, and those which adjoin them towards the east, where the breeding and raising of this sort of stock are, perhaps, better understood and carried on than in most other places, it is generally the custom to work them until the very time of dropping their foals; and, provided the labour in which they are employed is of such a sort as not to exceed the limits of propriety, it may be useful, both to the health of the mares, and

the growth of their foals which they are carrying. But still much care and attention are always necessary in such business when the mares are heavy with foal, as an over-heat, too severe labour, a sudden jerk, fright, or any such cause, may endanger not only the loss of the foals, but likewise that of the mares; such, therefore, as are used in harness should not be exposed to any sort of violent exertion, either by heavy dead pulls in the fields, or in indifferent roads.

The approach of the time of foaling is denoted by the sudden dropping of the flanks, and the increase in the size of the udder, with the glueing up of the orifices in the teats; and, as soon as these appearances take place, the mares should be put alone and left to themselves, or kept in gentle work, which some breeders think by far the best, especially with the team sort of these animals. In case there should be any difficulty in foaling, suitable assistance should be given, but not by any means before it is absolutely required, as much mischief may be the consequence of improper and unnecessary meddling in such circumstances.

The common practice of giving the mares particular sorts of drinks or drenches, in the ideal view of increasing their strength, and promoting the flow of milk, are not only perfectly absurd and unnecessary, but sometimes are attended with danger and injury. They cannot after foaling be left in too quiet and easy a state. There is in some places a notion prevailing, which is perfectly ridiculous, as being founded on no just grounds, that the first foal which the mare has, is seldom or ever so large as those which succeed, in consequence of the less capaciousness and distention that has taken place in her belly, and, of course, that they are scarcely ever so good.

The mares while with foal should be constantly well kept, and have a somewhat increased quantity of such good keep towards the latter end of the year, as they then begin to stand more in need of it, on account of the more advanced condition of the young which is to be supported, and in order to prevent the danger of their slinking the foal, in consequence of their strength declining from the increasing demand of nourishment which is made upon them. The letting them have the run of a pasture, or turning them into it in the night-time, is a very useful and proper practice, as the grass they get has the effect of keeping them properly open in their bowels, giving the foals greater strength when brought forth, and making the mare's milk better, without the sudden change being produced which is usual at the time of foaling. Some breeders even think that such mares being kept wholly in the pastures through the winter, is beneficial, as they are more at their ease, there is less danger of the foals becoming wrong placed, and of the legs or other parts being affected with humours falling into them; and in this way causing them to be more sound and healthy, and productive of better foals. Whatever methods are pursued, mares in such situations should never suffer any sort of want in their keep, as it will always be unfavourably seen in their offspring.

The means which are necessary to be attended to in respect to the mares, and in the rearing of the foals, will be fully noticed hereafter.

COLOUR OF HORSES.

Colour has sometimes been considered as a matter of importance; and perfectly good horses of some colours are certainly more scarce than of others, such as the fine blacks. The chestnut colour is supposed to denote more irrita-

bility and impetuosity of temper, as well as delicacy of constitution, than any other. The dapple-grey is considered beautiful. But there are useful horses of all colours; yet the good blacks and bays are, perhaps, the most generally esteemed, especially when destitute of white on the legs and feet. A good horse, can, however, hardly be of a bad colour; so that the latter is probably a matter of little consequence in reality, provided the former be perfectly good in its general qualities.

Section V.—*Principles and Practices in the Breeding of Horses.*

In the raising of good horse stock attention is absolutely necessary to many different points and circumstances, as, in the first place, to the form and structure of them; as upon these a great deal depends in whatever use they are to be employed. Where these are not good, the business which they have to perform is liable to be improperly and unsafely executed. Though their strength and hardiness may not entirely proceed from their exterior form, there can be no doubt that a determined justness of shape, and a well disposed state of their body and limbs are quite requisite and necessary to the production of perfectly good and safe action in their going. This is sufficiently shown by good and well-shaped horses being constantly selected by those who are proper judges of horse-stock. The movements in this as well as other sorts of animals are effected by the power of the muscles acting variously as levers on the bones, and which are so arranged and distributed as to be suited to the intentions for which the animal was by nature designed. On this account a very remarkable difference of form takes place in animals of the same class, one of which is capable of but little action, while the other has much speed, which clearly shows that it is a certain peculiarity of shape on which fleetness principally depends. There is consequently a necessity for this sort of formation, in order that the animal may have such properties, and it is well known from experience, to the judges of horse-stock, that it is such kind of form that gives proper ready action in union with fleetness of movement. It is clearly evident, too, that the strength of an animal is not wholly dependent on its bulk or size, which is a circumstance of importance, as it relates to the large heavy breeds of team-horses; since it clearly follows, that, provided the weight of the body of an animal, and the power of the muscles which are to put it in progression, be not well proportioned to each other, the size and weight must be greatly disadvantageous instead of being beneficial. Such horses as are of the full-blood kind, are, without doubt, those which are of the greatest strength in proportion to their weights of any that are met with. Of course their superior strength is not caused by their bulk or size, but by the peculiarity of the form and shape of different parts, as well as the manner in which their limbs are disposed, as is sufficiently evident from their close full loins, low hips, and the very great *muscularity* of their thighs and haunches; which is a singularity of form in such parts, that is seldom or never discovered in the large, heavy, black team-horses, so long and so much bred in some of the midland districts of this country. It would seem, indeed, from their great fleshy bulkiness, and their vast unwieldy weightiness, to have been bred rather for the use of the nicker than for heavy team labour; the false notion of strength being induced by large size, having continued to prevail to the present hour, and to have

actuated the breeding farmers in such districts to persevere in raising a breed so disadvantageous in comparison with some others. As the yearly expenditure of the produce of the soil in this nation by horse-keep is, when put in comparison with its limited extent of territory, extremely great, it is unquestionably a circumstance of vast importance that much more regard should be bestowed in choosing and providing breeds of the most useful forms, properties, and qualities, for despatching an equal proportion of work with a greatly less proportion of them kept and employed for such use. The necessity and utility of this sort of change is strongly enforced, by the increased consumption consequent on the increasing population of the kingdom; and is probably the most likely to be accomplished, if it can be done, by the use of strong stout stallions, of the blood breed, in raising such horse stock. It is, however, too often the case, that breeding farmers, who have mare stock which is favourably or unfavourably formed for any particular intention in the raising of such sorts of stock, are too much disposed to breed from them, without duly considering whether they can be useful or the contrary, in affording any improvement that may be desirable. They too commonly persuade themselves, likewise, that any sort of produce in the shape of a horse can be as easily sold as that which is of the more favourable mould. These are reasons why the country is so much stocked with such breeds of this sort of animals, as are suitable for scarcely any thing but the consumption of the produce of its lands. The main point, therefore, to be aimed at, in the raising of horse-stock, is, that of gaining strength, without that weightiness which is unnecessary, injurious, and useless; and such a position is equally applicable in all other respects, whether the animal be designed for the saddle, the carriage, or for working in heavy teams.

It has been already seen, that the true full-blood breed of horses, however slight they may seem to be on a hasty view of them, are, in fact, the strongest sort of horses to be any where found of the same dimensions and heaviness. They have a singular pliability in their constituent fibrous structure, and a peculiarity in the disposition of their limbs, that furnish them with the quality of great strength, which is not directly seen, but which is readily found on trial in any way.

The proper form and shape, as well as construction and properties, of the several different most important parts of these animals, as the *head*, the *ears*, the *eyes*, the *neck*, the *shoulders*, the *body*, the *legs*, and the *feet*, are somewhat of this nature and kind:

HEAD.

It is necessary that this should be properly small and thin of flesh, in proportion to the size of the body, which is rendered so in consequence of the neck part, to which it is attached, being situated in a slightly oblique direction to the surface on which the animal treads, by which the part becomes more weighty, and is sustained with more difficulty than if it were supported in an upright position. This part has its greatest and most perfect beauty of form, when it makes a straight line from the top part where it is fixed to the spine, down to the nose part of the animal, which is a peculiarity in the Arabian breed of this sort of stock. There should also be a suitable breadth and flatness of the forehead, with a prominent eye, the lids of which should be lean, flexible, and elevated. The side branching portions of the lower jaw-bone should also have a proper degree of openness and expansion, so as to afford

space for containing the wind-pipe, as well as for readily admitting the head to be brought in close with the neck; which is a mode of construction that is essentially useful and necessary in carriage horses, as well as those for the purpose of war, in which the heads are mostly carried high and much raised up. There should be a thinness of the nostrils, with a degree of largeness, openness, and elasticity; small mouth, with a certain depth and pliability of the lips; on which the good or ill manner of the horse in carrying his head a great deal depends.

EARS.

The ears are parts which should be situated in rather a backward direction, by which the forehead has a greater degree of boldness. They are readily moveable in different directions, by which the reverberation of sound is better and more perfectly received from different quarters. It has been asserted, as an extraordinary fact, that this animal, while in the sleeping state, has the power of keeping its ears in continual motion; one of them being mostly thrown forward and the other backward at the same time, which is useful in guarding it against danger. This sleep can, however, be only a slight sort of dosing, as in perfect sleep all the faculties and powers are suspended.

The absurd and hurtful practice of cropping the ears of horses has now nearly, if not wholly, been done away with; and the still more hurtful and foolish custom of removing the hair from the insides of the ears, is very improper, and ought not to be suffered to continue any longer, as they have both the effect of impeding the communication and impression of sound, without being in any way beneficial.

EYES.

The eyes are parts which are of considerable importance in horses, as they are animals which are perhaps more particularly liable to blindness and different other affections of these organs than any other of the quadruped kind; which, probably, arises from the diversity of the original formation of them, and from the nature of the methods in which they are managed in the stables and other places, where subjected to the direction of man. The eyes of these animals being situated more on the sides than the fore part of their heads, they are capable of seeing their danger more clearly, enabled to strike out at any thing which annoys them with more certainty of success, and to take in a large space of sight. As in the other sorts of pasturing animals, the pupils of the eyes of horses are somewhat oblong in their forms, which admits objects to be taken in, which are in front as well as on the sides of the animals. They have the property of being contracted and enlarged in such a manner as to suit themselves to the state of the light in which the horses may happen to be, which serves excellently for deciding on their healthy or diseased state; the balls of the eyes are differently put in motion, by suitable muscles for the purpose, which turn them in almost every direction, as well as draw them inward, they are kept moist and clean by the fluid supplied by a proper glandular body; and have a particular sort of membrane at their inner corners before, which is capable of being brought over the eyes at pleasure, and serves equally for defence and wiping away any offensive matters that may have rested upon them. This necessary membrane should not be in any way disturbed or destroyed, as is too commonly, through ignorance, done. The shape of the eyes of horses, externally, has considerable effect in producing full and distinct vision, as where they are too large or too round, too

small or too flat, there will be a short or near-sightedness, and from such imperfect sight the animals will be apt to start and stand still, or turn suddenly about, so as to endanger the persons who ride on or have the care of them. The most sure form, therefore, is that of the middle state of roundness and size. Small eyes, or those which are absurdly called "buck eyes," by some, are to be objected to, as, in consequence of such form, they are more apt to be affected with diseases than such as are larger. The best mode of deciding upon the states of horses' eyes is, that of examining them in a full concentrated light, by standing sideways, rather behind them, so as to look through them towards the light. It is, also, equally proper, for determining the state of the outer coats of them, as well as for shewing whether there are specks within the pupils of them, which point out the commencement of disease, and infallibly prove that the eyes have been formerly affected.

Whether there are differences in the sizes of the pupils of the eyes, is a point likewise necessary to be known, as well as whether they contract in proportion as the horses are exposed to stronger light. From the less full light in stables than out of them, the pupils of the eyes of horses are larger in than out of them; they, of course, when sound, contract as the animals approach the light, and when neither of them contract, they are stone-blind, or if but one, they are blind of the contrary eye. But too great a contraction of such parts equally points out a morbid state, and is sometimes so great as to produce excessive pain, irritation, and an inflamed condition of them, that renders the action of light greatly distressing to the animals. All these states and properties in the eyes of horses, should be well attended to and considered, in the breeding and raising good young horse-stock.

The deep furrowy wrinkles in the skins of the upper eyelids, especially of the older sorts of horses, is seldom of any material injury to them. But the shady lashes on them are beneficial, in lessening the action of light, from some height, as it falls upon them, and should, therefore, be seldom trimmed away from them, as is too much the practice in the stable, and is the cause of great injury and inconvenience to horses in travelling; and renders them liable to be shy, in consequence of the imperfect sight arising from the deceptive sudden striking of too much light on them, and their being deprived of the means of resisting it. These shady lashes are, consequently, to be carefully preserved, and kept in their proper natural order in breeding these animals.

Injury or inconvenience, also, occurs in several ways, to the eyes of horses, from the darkness of the stables in which they are kept; as well as from the part of the harness which is put on the heads of them, where it happens to press against the eyes or their lids, so as to interrupt their movements; which is frequently the case in wagon, coach, and other team horses, though they are often of much benefit as defences against strokes and accidents of other kinds. Too much and too tight reining up of the horses of such kinds, may be another cause of their eyes being diseased, by hindering the free passage of the blood into and through their heads. These are, of course, to be well guarded against in raising young horses of different kinds.

There is a similarity of colour in the eyes of horses, in general, except those which are wall or ferret-eyed; in the former of which the pupils are partly of a white appearance, and in

the latter, there is a red tinge. The too common notion, that the horses, with the former sort of eyes never become blind, is absolutely absurd. These conditions of these parts are to be well regarded in breeding such stock. The tubes which arise at the inner corners of the eyes, and convey the moistening and cleaning fluid produced in them to the nose, sometimes become obstructed and filled up, so as to cause great inconvenience by its overflow; they should, therefore, in raising young horses, have due attention, and be kept open by such means as clear them of any collected matter, such as water, thrown up in a proper forcible way from their lower openings in the nostrils, in cases where necessary, but which is seldom requisite in breeding and raising young horses. Horses are liable, also, to be affected in their eyes at certain intervals of time, with an inflammatory state of them, which is termed moon blindness, as being supposed to be influenced by the changes of that planet. A sudden and temporary sort of blindness sometimes takes place in horses, also, from too severe exercise in travelling, and in other ways; and they are not unfrequently affected with inflammatory states of their eyes, from the sharp exhalations which proceed from the dung and litter of filthy stables; but diseases of these parts are most frequently brought on by hard, dry, high keep and the want of proper exercise, which can only be removed by reducing the strength of the animal in suitable ways. All such causes and states of blindness are always to be duly regarded in breeding and rearing these animals, with a view to the production of better and more perfect stock.

NECKS.

The necks of horses are of much consequence as they regard the carrying of their heads, and the influence they have on the motion of the shoulders. They are the most proper where their inferior extremes come high out of the chest, the contrary giving what are termed ewe necks, which induce the horses constantly to throw up their heads, with the nose parts of them right out, whenever curbed or pulled in, from which causes they become incapable of seeing their way, which is attended with danger in some cases. Thick necks are, in general, indications of strength, and they are constantly of greater thickness in stallions than other horses, which induces some to delay the cutting of their young horses for some years, in order to give them more full and elevated crests. The several bones of which the necks of horses are formed, allow of motion in many different ways; and such parts in pasturing animals are of more length, to permit of their feeding with ease. But the shapes of their necks are much varied by the agency of different causes, as in such coach and other team horses as have been in the habit of being much reined up, they become so stiff and fixed as to render them incapable of grazing when turned into the pastures. The breeders and rearers of horses in some countries, such as Germany and its vicinity, have a practice of letting their young male horses have their food out of high boxes or troughs, so as to create the habit of bending their necks in a sort of arch-like manner, which, by time, has the effect of giving their necks and foreheads a finer and more lofty and grand disposition of form.

SHOULDERS.

The shoulders are points or parts which are of very material utility and consideration in the form and economy of the horse. The conjunction of them with the bodies of the animals is most wisely and beneficially effected, as well for the sustaining of weight as the producing

of motion, being attached to them by means of strong muscles, and not in the way of joints, as is the case in some other parts. The fore portions of them are consequently suspended, as it were, between them by stout muscular insertions and expansions alone, the inferior extremities of which are fastened betwixt the ribs, while the superior uniting together are strongly attached on the insides of the shoulder-blades, by which means an easy free motion in a backward and forward direction is not only preserved in the parts, but the danger of shocks, arising from the propulsion of the bodies of the horses forward on them, is lessened, if not wholly prevented, which would not otherwise have been the case. It is commonly considered as an excellence in the form and disposition of these parts, when the blades of the shoulders are placed in a neat slanting manner back towards the upper portions of the body, so as to let the legs have a position sufficiently forward of them, as being greatly favourable to speed. There are, however, animals which have much swiftness where the shoulders are upright, and the legs before placed much under their bodies: this is the case in the deer, the hare, and some others. The above disposition and situation of the shoulders and legs is particularly necessary to afford good and safe action in horses of the saddle and road kind, and the blade-bones in them should not come too nearly together at the top part of the withers, by which too much narrowness is produced in the part before the saddle, which, whenever it happens, shows a deficiency of muscular substance, and, of course, a want of strength as well as action. This is what some term thick-shouldered. In saddling horses, it is, consequently, necessary to see that it is not put too forward, as the action of the shoulders may be much restricted by the pressure caused at the fore part of it, and the motion consequently be impeded.

BODY.

In the body parts, the chest should be somewhat broad, having the muscular portions of the breast bold and prominent; as, when the former is of too great breadth, the horse has a rocking unpleasant motion in going,—and when too narrow, the fore legs are too closely placed to each other, rendering the fetlock joint more liable to be cut or bruised in travelling. The brisket, or back part of the chest, should be broad and full, keeping the elbows out in a straight direction with the body; as, when it is too narrow, the elbows constantly tend inwards, by which one fore leg is liable to strike the other on the inside at the knee, which produces what is named the speedy cut, and is extremely apt to throw a horse down when on the quick trot. The same narrowness of this part has the effect also of permitting the saddle girths to slide forward, so as not merely to vary the situation of the saddle, but likewise to abrade and rub off the skin of the elbows by coming in contact with such parts.

The body part should have proper capaciousness and roundness, the back part coming from the withers in a rather linear *hollowish* manner to near the middle. The *lumbar* parts broad, full, and straight, and the *croup* sloping in an easy, slight, gradual, manner towards the tail, which should proceed high out of the former in an arching manner. The root of the tail, or *dock*, being thick, is generally considered to be a proof of unusual strength; and not without good reason, as it shews that the back-bone must be large in the same degree. In the horse, as in other animals designed to carry weighty burthens, the back-bone has but little flexion, which is, however, made up for

by the length of the neck, which allows of the hind parts and thighs being got at by the mouth of the animal when necessary. But, in the short-necked sorts, the habits of which, in getting their food, render much rapid, lateral, and twisting movements necessary in their fore parts, have the capability of bending their backs in a very ready and extensive manner, but which unfits them for supporting loads.

There should be a close inclination in the last rib to the hips, which is termed being "ribbed home;" but which is not caused by its being more lengthened, but by the hip bone coming more forward, as horses thus formed are constantly short backed and long quartered. For as the body is inactive, and solely moved by the muscularity of the quarters, the shorter it is, of course, the larger their sizes, and the greater their strength will proportionately be. There should be a degree of lowness and not too much projection in the hips, which though they give an apparent narrowness, when put in opposition to those of the contrary shape, yet there is the same amount of muscular materials, only they are brought into a more close and rounded form. When viewed from behind, the lower portion of the haunches should come forward in as wide a manner as the hips.

LEGS.

There should be, in every respect, a straightness in the fore legs, which should come a little towards each other at the feet. The higher portion, commonly termed the arm, should be broad and full, with plenty of muscle, that the leg may be bent strongly, and in a ready manner. The knee should be well shown, broad, and flat. The inferior portion of the leg, or shank, part, should appear broad and flat, when seen sideways, especially behind the knee part. The tendons of the muscles of it should be perfectly detached from the bone, and have an elastic firm feel. There should be a breadth and boldness of the fetlock joint, the pastern having neither too much upright position, or too great length, as when it slopes properly, the percussion of the body, in its motion, is lessened, and rendered easier to the horseman.

On a side view, the thighs should be broad and have sufficient muscularity, the large tendon that ends at the hock being well separated from the bone; the hocks be so distantly placed from each other as to let the shank-bone be exactly in an upright situation. If they come too closely together, they throw the feet out a wider distance apart, causing the legs to have a slanting position, and producing the crooked irregularity of shape which is called "cat hammed." And though horses thus formed may often have more speed than some others, they are, doubtless, weaker in such parts, and their hocks are more subject to be diseased in various ways. Such shapes are most frequently found in horses of the fast trotting kinds.

FEET.

The feet are parts of the greatest importance, as upon their sound and healthy nature and construction, the value of the animal almost wholly depends. They should, therefore, be always as well formed as possible in every respect.

In the young horse that has never been shod, the *hoof* should have nearly a round shape, being the widest on the side parts; which obviously increases the foundation on which the foot rests, thus giving greater steadiness to the animal in its motion. The diversity which there is in the shape of the foot of

the horse sort from that of all other animals of the pasture kind, is deserving of notice, as shewing the purposes for which they were designed; for had their hoofs been wholly divided, as in the cases of the several sorts of neat-cattle, deer, sheep, goats, and some others, they would not have been so well suited for conveying loads, drawing various sorts of weighty bodies, or working in teams of the field kind, as they are by the solid rounded shape of their fore parts, which give a greater capability of resistance than they could possibly have had from the ready bending and yielding nature of the wholly divided hoof.

The whole of the particulars relating to the nature and formation of the feet, are necessary to be known and well understood by the breeder and rearer of young horses, in order that any fault that may appear or take place in them may be properly counteracted or guarded against, as good feet are of the utmost importance in every point of view.

The particular forms or shapes of the different parts, and other circumstances, which are met with in the several breeds, varieties, and sorts of horses, have been already given in characterizing and describing them; and their nature, construction, properties, uses, and morbid states, are very ably and fully explained in the *Complete Farrier*, and some other works of the same kind.

It has been stated, by a most experienced and intelligent breeder and rearer of live stock, that in all the varieties, breeds, and sorts of horses, especially where good or great action, agility, and speed are necessary, the connected general form should be, that the head be as small as the proportion of the animal will permit; the nostrils well expanded; the muzzle fine; the eyes cheerful and prominent; the ears small, upright, and set near together; the neck, rising out from between the shoulders with an easy graceful tapering curve, so as to join in a neat handsome manner to the head; the shoulders should be well thrown back, so as to go into the neck, at what are termed the points, unperceived, which, probably, facilitates the going much more than the narrow shoulder, the arm, or fore-thigh muscular, and tapering from the shoulder, so as to meet a fine straight sinewy, and bony leg; the hoof, circular, and wide at the heel; the chest, deep, and full at the girth; the loin, or fillets, broad and straight, and the body round; the hips, or hooks, not by any means wide, but the quarters long, and the tail set on so as to be in nearly the same right line as the back; the thighs, strong and muscular; and the legs, clean and fine boned; the bones not round, but flat, or what is termed *lathy*. Some breeders, on the other hand, think, that for light and heavy team labour, there will be advantage in having the neck only of a middle length, and not too thick; the chest, wide, with great breadth of breast; thick and strong in the shoulder, but not too high, nor falling too much backwards; fore-hand, rather low, to prevent pressure on the wind-pipe in drawing; good length of waist, well supported by width of loin; quarters full and rather raised; thighs thick and large in the bone; legs, rather short and flat, but strong and firm; the fore-feet, even and not too distant, and the hoofs good and strong; the size such as to suit the particular purpose, as from fifteen to sixteen and seventeen hands in the height. By these variations in the forms of the different parts, it is believed, that the draught and speed in working, which are two very material circumstances, will be greatly benefited.

The great art, or main object, in the breeding and raising of all sorts of such stock, is, therefore, to discover the means of readily, cer-

tainly, and perfectly giving, or imparting those different forms, properties, and shapes of parts, which are so essentially necessary in the several kinds for fitting them for their particular uses, to the young offspring. This is the principal mystery and art of the breeder; the correctly effecting of which, unquestionably, requires nice and particular attention, and exact judgment; for, though there may, probably, be something in the nature of situation, as it regards soil, climate, and the produce of the pasture; such as light, dry, and hilly, generally affording the clean-limbed, vigorous, and active speedy kinds; while in the more flat, moist, and rich pasture ones, the larger, less active, more imperfectly formed, and less hardy sorts are raised; yet much more depends on the means above described, being made use of with judgment and exactness. The most material and necessary point, is the exactly suiting the forms and qualities of the horse and the mare to each other, and these should be adapted to the nature, shape, and properties of the particular sort or improvement which is required. In effecting which, the natural properties of each should not be too remote, as where that is the case, the produce is seldom good; neither the connected form or quality being such as are desired. Thus, in giving size to coach horses, mares of the cart kind are often crossed with full blood stallions, which has rarely the intended success. The same is the case in many other instances. But the business may be well and easily accomplished by making use of such horses as have a nearer relation in their properties to these mares, and which are closer and better formed. In the practice of crossing, it has been much too common a notion, that there must be some opposite qualities in the animals, in order to produce good and valuable stock; so as that there may be the chance of having the young to partake of the medium desirable qualities of both; in which view, it has been usual to put mares with length of backs to such horses as are short on the backs, or the contrary. But this practice very seldom proves beneficial in the way intended.

The nature of the head is likewise a very material point to be regarded in the practice of breeding, as strongly shewing the nature and properties of the animal, it being very unusual to meet with a bad horse that has a light, well formed, handsome, and well set-on head.

It is, in all cases, improper to breed from a bad, or, indeed, an indifferent animal, on either one side or the other; as success is far more likely where each of them have some sort of goodness and perfectness about them, than where they are really and naturally bad in their kinds and qualities.

Under the heads *Horse* and *Mare*, as given above, the different properties and requisites which are the most essentially useful and proper for the several intentions of breeding will be found, laid down in a full manner.

There are two ways in which the breeding of good horse-stock of every sort is to be principally accomplished, namely, that of properly crossing until the suitable form, shape of parts, size, strength, and necessary qualities, are perfectly attained; or that of breeding in the same line, or from the offspring, so as to preserve the exactness and uniformity of the shape, and other necessary and important objects and qualities; and as by too much crossing, it is evident, great mischief may be done, it is equally clear, that by properly and judiciously combining it with steady breeding, in the same line of produce, every thing may be gained which can be wished for in the raising of good and valuable horse-stock of all the several kinds.

SECTION VI.—*Proper and necessary Practices in Keeping, Weaning, Rearing, Breaking, Training, Shoeing, and Managing, Mares, Foals, and young Horses, of all Kinds, in every Intention.*

THESE different practices, well understood and skilfully conducted, constitute the main art and business of raising good stock of the horse kind; for, unless they are well attended to and properly managed, however well bred and regularly produced, it will be utterly impossible to raise young horses of the best sort, whatever their nature or kind may be.

KEEPING MARES IN FOAL, AND AFTERWARDS WHILE WITH THEM.

The season which is most proper for mares having the horse, and being rendered with foal, and for dropping them, or foaling, has been already noticed, in speaking of them as brood mares, in considering their necessary properties and other points. While they are in this state, they should be well attended to, to see that their keep is sufficient without being too full or abundant, as mares in foal should constantly be kept in good condition, without being fat. This is requisite in all the sorts for the production of proper, strong, and healthy foals, the goodness of such keep being carefully increased as the period of foaling advances. Immediately after the foaling has taken place, where there has been any sort of confinement, the best method is, in general, to turn the mares and foals out into some warm, sheltered, dry pasture, where the foals can suck at pleasure, and where the mares can have corn, carrots, or other such food, given them in the morning and evening, for five or six weeks, at first, so as to promote the flow of milk in a favourable manner. Something of this sort has long been the practice in the best breeding and rearing districts of the kingdom, and is, probably, the most proper method that can be had recourse to in the early raising of such young produce. The expenditure of money, in such keep, can perhaps never be more profitably employed, than in providing it for the supporting of the mares in this way, until the grass becomes in plenty, as it prevents the bad consequences of having the young produce checked in their early growth, and thereby becoming much less valuable. Such food should be given in some crib or vessel so contrived as to be just raised above the surface of the ground, so that the foals may learn more readily to eat the food while sucking, which is afterwards of much advantage to them. When the foals have been thus brought on for the first period, any tolerably good pasture, or sort of food, that will keep up the milk of the mares tolerably well, will be sufficient for the purpose; but where they are not worked and are fed with other kinds of food, they should always be of the better sort.

The practice of putting mares which have foals to different sorts of labour, of the field or other kinds, would seem to have something severe and unnatural about it; but it is nevertheless had recourse to in many places, and by some good store masters, in raising of such young stock, and if not with much evident benefit, at least without any apparent disadvantages; the foals, during the time, being generally confined in some proper place, but occasionally suffered to run by the sides of the mares, which, while so worked, should have proper feeds of good dry food given to them twice in the day, of which the foals will sometimes partake, when permitted. In this manner the largest team horses have been frequently raised. It is necessary, however, in these cases, to prevent the foals from sucking while the mares are in too much heat on their return

from working, lest the overheated milk should injure them. Where they run at the sides of their mothers, they may be suffered to suck occasionally, which will prevent any mischief that might otherwise arise. In case such mares are not wanted for working long in the summer, they and their foals should be turned into some good pasture, not too heavily stocked, until the time the foal is weaned. These seem to be the best methods to be followed while the foals are suckled, which is usually about six months, namely, from the time of being foaled, till towards the end of September, the period at which they are commonly weaned.

In the race or blood sort, the management with the mares and foals, as the latter are dropped more early, is in some respects different, they being both generally kept in the house, at least for some time at first, the former being constantly well fed with suitable, high, and forcing keep, such as tends to increase the milk in the most favourable manner; it would be better, however, not to have the foals too much confined, but to suffer them to have liberty to run out occasionally into large proper yards or grounds suitable for the purpose, as they would thereby become more healthy, and get better action and more alertness of motion. Afterwards the mares and foals should be turned into suitable large pastures, especially in the day-time, until they are to be weaned. Much judicious care and persevering attention are always necessary with the foals, as well as the mares, from the first, in order to raise and fit them in the best manner for their intended use.

Proper sheds, with yards and other conveniences, for the different mares, while in foal, for foaling and keeping the foals in, while young, are also very useful, in raising other sorts of young horse-stock.

WEANING THE FOALS.

For for this purpose, it is always a good practice, to have the foals confined in some proper building or place, at a distance from the mares, where there are the necessary contrivances fitted up for their having their fodder and other food in a ready and convenient manner. In these they are to be well supplied with locks of good, clean, green hay, whether of the common or other kinds, and oats which have been fully cleared from dust and dirt by proper sifting. Some breeders have the oats coarsely ground, and given in that way, but they are probably best when eaten whole. Where the foals have not been used to clean oats, they are best given in the straw. Many, with the better sorts of foals, have recourse to still higher sorts of keep, such as fine meals of different kinds, carrots, and other rich forcing substances, which are considered greatly beneficial in raising these young animals. The opening quality of the last is often very useful, and a little bran and oats are always necessary. The foals of the working sorts, after being taken from the mares, are sometimes put up in such places as above, for three or four weeks, to be weaned; the mares being kept at work, with hard dry keep, which assists much in the business, as the labour, together with the hard meat, has a good effect in drying them of their milk. It is supposed, by some breeders, that the foals, during the few weeks of their weaning, are better for being wholly or very much out in the free air, while the mares are kept in the house, as the former will thereby be much strengthened, and their hardiness increased, while the latter will more quickly lose their milk. That foals at this time, as well as afterwards, should be allowed to exercise and enjoy themselves as much as possible, in proper pastures or other places, there can scarcely be a

doubt; but whether they ought to be wholly kept out at so early and tender a period, is not by any means so evident, as many who have had great experience, though they believe it proper and useful to have them out a great part of the day, in suitable weather, consider it dangerous to let them remain exposed through the night, whilst in such a young delicate state. Others again doubt, whether foals should ever be housed at all, and think that they may be better for being exposed, even on dry and cold grounds, when they are well fed, as causing them to grow more strong in every part.

By managing foals in these ways, they soon become easy, tractable, and reconciled to being separated from the mares.

At this time, it is a practice with some breeders of horses, in consequence of the mares being uneasy and hankering much after their foals, to have them smoked with particular substances but for which there seems to be no good reason whatever.

REARING FOALS AND YOUNG HORSES.

When the foals have been properly weaned and separated from the mares, it is usual to put them into some suitable sort of good, not overstocked, home pastures as soon as possible, which is a much better practice than confining them longer in the houses, as by having suitable sheds connected with them for the foals to run into, as they may find it necessary, much advantage will be gained in respect to hardiness, action, and health; as in houses and confined yards and grounds, they have too little fresh air, activity and exertion, for their natural habits, in the first and more early states of their growth, when they are so very playfully inclined, and when, of course, they should have all necessary means for acquiring strength, vigour, and a disposition for taking in the proper quantity of food, so necessary to their due increase in every way. As the first winter comes on, they are commonly supplied with food and keep of suitable kinds in these shed buildings, or other proper places, such as good clean hay, cut straw, and a little oats in the sheaf, with which they mostly go on perfectly well. The quantity of heating keep, in the more early state of the foals, should be rather nicely attended to, as it may otherwise be too great for producing the proper effect in raising them to the most advantage. Corn and mealy substances have much action in this way on such young animals; they should, consequently, be given in but small quantities at a time, and repeated oftener in the day, as twice or more, by which the proper state will be more effectually kept up, and the rearing go on in a better manner. Indeed, the largest young horses are sometimes reared, in their foal states, wholly without, or nearly without, any such substances; as running out freely in the pastures and hay keep being found quite sufficient for the purpose. But this is probably running into the contrary extreme, as wherever good horse-stock is aimed at, a little of such food seems to be required, in order to raise it to its proper state in the most full and perfect manner.

The practice of raising foals in their infant state, by turning them to hay-stacks, in dry situations, and keeping them constantly out in the open air, without any other shelter than such stacks, is too severe, inconvenient, wasteful, and slovenly a method, even in the best management, to be recommended, though it has been greatly praised by some, as a hardy successful mode of raising such young stock.

In rearing young animals of this sort, in these early periods, it will, most probably, be the best, in all cases, to have it done in the most hardy and exposed open manner that their

nature and habits, in the several kinds, will admit; as by such means, better, more active, and hardier horses, in every respect, will be raised, as where they are too much pampered in their early bringing up, they never become so durable, or stand high keep and hard labour so well. It is on this account that the small mountain horses are so much more capable of withstanding every sort of hardship than those which are reared in warm level countries.

Besides, by standing and resting too much on the heating littery matters in the houses, in these early states, their fore feet are liable to get diseased, or become in a bad condition, which they never afterwards fully recover.

As early as it can properly be done, in this first stage of rearing foals and young horses, they should be occasionally accustomed to have themselves handled, their feet taken up and gently hammered on, they should be haltered, and be accustomed to lead in it, as by such means many advantages are gained, they become far more easy and familiar, are shod and broken-in with much less difficulty, and submit to every sort of management much more readily.

Some breeders advise the docking of their tails in the latter part of this early period of their rearing, frequently with the view of preventing the necessity of their being nicked. But it is a point of some consideration, whether it may not be injurious to the young animals, when done so early, by depriving them of a part of their natural means of driving off the flies, and other insects, that may annoy them in the summer season; and by tormenting and preventing them from feeding sufficiently, injure their growth and rearing. It is, therefore, at all events, better to defer it to a later period, where it can be properly done.

About the end of this first season of the rearing of young horses, it will be proper to separate and keep the colts or males, and the fillies or females, from each other, until the former be castrated, where that operation is intended; as by such means any too early endeavours to propagate with each other may be prevented.

In the second summer's rearing and raising of such young horses they are often turned into the common and rather inferior pastures, which may answer sometimes for the more ordinary sorts, where the pastures are not too soft, heathy, or boggy, and the keep in plenty. But where such horses are of the better and more active speedy kinds, dry, salt, marsh pastures, or such as are high, sound, and well supplied with good water, are always to be preferred, as the fine air and other matters, with the suitable goodness of the keep in such pastures, will be greatly beneficial in promoting their most healthy growth and rising perfection. In the pastures of these sorts they should be suffered to remain until the succeeding winter comes on; when they may be allowed either to continue running on them, or be brought home into places of the yard kind, properly littered for feeding and keeping them in. With good young horse stock, the latter is always the better method. While in such yards, the horses, which are now coming two years old, should have as much cut chaff as they can be induced to eat, by having it mixed with a little bran or pollard, which, though somewhat more expensive, is greatly useful in promoting the better feeding in such cases, and the better going on of the horses in every way. A small feed of oats should be allowed in addition, twice in the twenty-four hours, amounting in the whole, in the course of that time, to about a quartern, or sometimes, perhaps a little more; and as it has been seen that young horses, in most cases, are worse in many

respects for being too greatly confined in houses or small yards, they should be turned out for some time every day, into some large adjoining grass pasture, where they can take full exercise in the free air. The same course of practice should be pursued with such young horses, when fed in the house during the summer, in the soiling method, though there may be some loss of manure in consequence.

In these sorts of rearing management, the young horses will most generally be found to get doubly fast on, and be much sooner ready for any use or intention for which they may be wanted; so as to pay far better than when reared in the more common modes.

Many breeders refrain from giving oats and other such high keep to rearing young horses, on account of the expense; but for good stock of such kinds, nothing can be properly done without them, nor could they, in all probability, yield greater profit in any other way; they should, therefore, never be omitted in such use. The consumption, taking the length of time in the whole to be about fifty-three or fifty-four weeks, will be only about half a bushel in the week, which will not cost more than from about one and sixpence to two shillings in that time, which is a mere trifle, when the difference of raising good and bad stock is properly considered.

The estimates of the cost of the other necessary pasture keep, and different matters used in raising young horses to their full growth, as they must, of course, vary much, according to their nature, circumstances, and situations, would be of little utility, as no general application can be made. Where, however, good produce of such kinds is met with in districts or places which are suited to the rearing of horses, they will, with proper care, be found to leave a full and ample profit, and to pay, probably, as well or better than any other sort of live stock management. But with common or very inferior young horse produce, there will be little or nothing at all gained, in many situations, however good the management may be; it is, therefore, in almost all cases, the best practice, to raise the more valuable and useful stock of this kind.

In rearing young, full-blood, or race horses, pastures which are capable of affording plentiful keep of the proper kind for preserving the mares and foals at first, and the latter afterwards, in good full condition, are to be preferred; and if they be large, high, dry, and hilly, with a sufficient supply of good water, they are so much the more proper. The mares should have a little oats, or some other such good dry keep, when put in such pastures, before the grass is in its more full growth; but which is less requisite, or wholly unnecessary, afterwards; as where such grounds are of sufficient extent, the young horses will generally go on well in their thriving condition, without the mares being so fed.

For raising the hunting kind in the most beneficial manner, much the same sort of pastures are to be preferred, only with this difference, that they should be less good, and not so full of keep; in order that the young horses may not be rendered too gross and full of condition, so as to be unfit for undergoing the necessary preparation, without injury to their constitutions, for rendering them properly useful in the intention for which they are designed.

In the more early or later periods of the rearing of young horses, the operation of castrating them is very usually performed; some, indeed, think it the best done while the foals are sucking the mares; others at a later season, as at one or two years old; but this delay is

dangerous, from the greater loss in case of accident, as well as from its tending to injure the head in its form and size, and rendering the animals less lively in their dispositions. There are others, however, who consider deferring this operation to a far later period, as three years old or more, has advantages in giving a fuller and loftier crest and fore-hand to the horses, and a stronger and more perfect character to the limbs, particularly the joint parts, as also a deeper and more bright shade of colouring to the coats, than is the case with those which have been earlier gelded. It has, indeed, been very justly noticed, that though it renders them more tractable and more safe and fit for being turned with mares and other horses to grass in the pastures, it enfeebles them in their make as well as their constitutions, as the gelding is unquestionably more tender and delicate, and less capable of supporting the extremes of either heat or cold. It is, in short, well known, that such ungelded horses as work in the drays of the brewers, and are never clothed in the stables, though under the necessity of often standing many hours together in the streets, are constantly in better condition, and finer and more sleek in their coats, than geldings of the same age and sort. In the character and shape of the head, there is a very material difference between the uncut horse and the gelding; in the former, the forehead is more broad; the eyes more bold and prominent; the nostrils larger, and more capable of being distended; the wind-pipe larger and more open; and which is probably the reason of their being in general better in their wind than geldings.

The most proper time of the year for having the operation performed, with the least hazard and to the most advantage, in different respects, is when the season is the most settled, mild, and equal, about the month of May; as much earlier or later there is greater danger of too much inflammation taking place. It is, also, in most cases, useful to keep the young horses up for some time, in order to empty the contents of their bowels, before the business is executed. A rainy or wet state of the weather is always improper, and in case such weather comes on after the gelding has been completed, the animals should be taken up into some proper roomy shed or building, where they can move freely about. The several modes of executing the business will be considered in speaking of the diseases of horses.

During the whole time of early rearing, the year-old and other colts are to be constantly kept quite separate from the mares and their foals, as otherwise they are sure to disturb and injure them greatly.

BREAKING YOUNG HORSES.

The main object in this business is, the giving young horses good, useful, and necessary habits, and preventing their acquisition of bad ones. This is best and most effectually done by mild and gentle treatment, and the gaining the perfect confidence and favour of the animals. For the horse, like every other young animal, when it once becomes firmly and fully attached to the person who has the care of it, will suffer itself to be directed and managed in almost any way which he may please. Therefore, when by such easy conduct, the young foals and horses get to be perfectly free and familiar, they should, while with the mares, be frequently accustomed to having the halters put upon them; and then, when they are afterwards taken wholly from the mares, they should again be inured to the halter, and be constantly led about in it, until they become quite tractable, when they may be tied up in the stalls of the stables or other places, be

mildly rubbed down in the manner of other horses, and the feet should be handled and taken up, so as to be cleaned if necessary. When they have become quite easy and familiar under these trifling operations and practices, they may be put into the paddocks or pasture-grounds, where they are to be kept, the same keeper being always employed in managing them. These methods of managing them should be constantly kept up until the practices are firmly fixed and established, when they will be ever recollected with readiness.

When these beginning proceedings, which should not be too long continued at one time, have been severally finished, it is very useful to have the horses constantly well fed, as soon as the halters or bridles have been removed, as by such means they will be induced to have such practices performed on them more readily and patiently. In putting the saddles and bridles on such young horses, it should be always recollected, that they are more delicate in their feelings, from not being so much accustomed to the tightness and restraint of such articles than older horses, therefore cannot bear to be so much girded. The bits of the bridles, in such cases, should be of the plain, snaffle, slabbering kind, but much thicker than those in common use, in the centre hinges of which should be fastened, small plates, with moveable beads, so as to lie upon the tongues, and induce the horses to move their jaws, and prevent them from bearing hard upon them so as to deaden their mouths. Being bridled in this manner, they are to be reined up to the large girths or surcingles that pass round their bodies; but which should not be done in too tight a manner, or for too great a length of time, in the beginning, as much pain and uneasiness are thereby produced. At first, the young horses are usually led by means of a cavesson, which is fastened round their noses, and which should always be used gently, as it is a very rough and severe contrivance. In saddling, care is to be taken to lace and gird them rightly, so as to afford no impediment to the action of the horses, they being left unreined up in going into and out of the stables or other houses, as otherwise accidents may happen. Where there is any shyness in young horses about the heads, much mildness and gentleness are necessary in bridling them, as, if they once get any sort of fright, by rash usage, they rarely forget it again, but are ever afterwards troublesome to bridle; and in having any thing done about their heads, they should never be held close by the lower part of the nose, as it prevents their breathing, as they only breathe through that part. In the first shoeings of such horses, much care should be taken in handling their legs and feet, that no sort of harshness be made use of, as they are often rendered vicious and refractory, in such operations, for want of due attention in this respect. The ages, sizes, and states of the horses, are to be well considered, in breaking them to work; the smaller sorts, which are more compact and united in their forms and action, are usually more able to bear hard labour at an early period than those which are large, and of a more loose and worse make.

The first step in the business of breaking young horses, is that of lounging them well in a circle, by having a long, thin, small portion of cording fastened to the cavesson, and held in the hands of the breakers, round whom they are made to trot in as full a circle as it will allow; which has the benefit of giving ease and pliability to the shoulder and other parts. In order to produce the most advantage from this practice, the heads and the necks of

the horses should, however, be left at full liberty without being reined up, as is the common method. They are after this to be backed and brought to their proper paces, as shewn below, and under the head *training*.

In backing such young horses, different modes are made use of to effect the business; but it is, in general, very easily done under proper circumstances. With some, the animals are taken to proper pieces of ploughed or other grounds, and made to walk sharply round in the halters and bridles, as held in the hand,—and, when somewhat exhausted and tamed by such means, sham efforts are to be made to mount them, in a slow deliberate manner, till they appear quite patient in bearing them, when they may be fully mounted, being led carefully by other persons. The riders should cherish and encourage them almost at every step as they pass forward, and should then move themselves well in the saddles or on the backs, the leaders removing their hands further from the mouths of the horses, until they go readily forward of their own accord by the mere direction of the persons on their backs. By mounting, alighting, and cherishing, the young horses in this manner for a number of times, they are soon brought to stop or go forward as may be thought proper, and to need no further trouble, except that of keeping them up to it. The gears, in which they are confined and conducted, may then be gradually left off, until they can be managed in the usual manner.

Others prefer the simple method of putting pad-saddles and loose bridles on the young horses, and then leading them along by the side of some perfectly tractable horses, on which they ride in the most public and exposed roads and places, until they become quite gentle and easy, when some proper person may try to mount them,—and, if no resistance be offered, actually back and ride them for some time with the other horses till they become quite tractable; but should a disposition be shewn to resist, then the trials are to be deferred till other future periods, when they are become more quiet and accustomed to the nature of the business. In this mild way very obstinate and refractory horses may often be broken with great ease and facility with little expense or trouble. There should be nothing hanging down in a dangling manner from the saddles, so as to startle or interrupt the horses in these early trials.

With light team, and occasionally with other sorts of young horses, there is another way of effecting this business, which some consider as a very excellent one,—which is that of putting such young horses in their full harness, in the middle of other team horses, letting them have no weight to pull, so that they may be dragged round by the teams without any sort of interference by the drivers, such dragging being continued until they are become quite gentle and tractable. They are then to be mounted and ridden in such situations, where they cannot be unruly, so as to dismount their riders; on account of the other horses in the teams keeping them in order. By these means such young horses soon fall into good and tractable courses, and move with the same ease and regularity as the other horses, being thus broken in almost without difficulty or hazard.

The tenderness in the mouths of young horses, from the bits of the bridles used in breaking them, is always to be guarded against and prevented as much as possible, as it causes them to have less feeling in them afterwards, and, of course, they have worse mouths.

Most sorts of young horses may be well

broken in, in some of these ways; but, in the better and finer kinds, great care and attention are necessary, as they are, perhaps, the most disposed and liable to get bad habits during the practice. On this account, they are very commonly backed and broken in a distinct and separate manner.

The practice of breaking horses, as usually performed, is far from being proper, and shews that it is not well understood. There is a great deal too much of harshness, roughness, and brutality, as well as frequently a disposition to play tricks in it, in the usual methods. The principle on which the practice is chiefly founded is that of giving the animals suitable, useful, and necessary, regulations, so that they may be managed with ease and advantage, and conduct and carry themselves in a proper handsome manner. But this can never be done by improper curbing, and the harsh whipping and flogging treatment, which is that which is the most usually had recourse to in the ordinary breaking of horses. Such are the nature and disposition of the animals, that it is only likely to be accomplished by mild and very gentle practices, so as to gain the confidence and secure the attachment of them; and then almost any method may be pursued with them which is found necessary. It is never a good practice to curb, check, or whip them for committing faults, which they could not perhaps avoid, as it makes them fearful, and liable to commit them more frequently. They should be prevented as much as possible from getting bad tricks, by being with horses that are given much to them, as young horses readily learn such tricks, and scarcely ever forget them. The bold riding of horses is always proper, and most especially so in the time of breaking them.

Thus by tender and gentle management, and preventing the tempers of horses from being irritated, the breaking of them may be, in common, readily, easily, and beneficially, executed.

The means of rendering horses quite gentle, easy, temperate, and tractable, in the different sorts of harness, in the shafts of carriages, and in traces, as well as in their several paces on the roads, are of very great utility and importance, as causing them to be so much more desirable and valuable for every purpose; they should, therefore, always be resorted to in the early rearing and raising of such stock.

TRAINING DIFFERENT KINDS OF HORSES.

In training young horses of the several sorts, much care and circumspection are constantly necessary, while in the more early states and stages of their raising and bringing up, in order to give them the most proper and beneficial habits and movements for the different uses and intentions for which they are designed; as great differences, in these respects, are always required to fit them perfectly for such views. The matter has, however, hitherto been but little attended to, and that only with some particular kinds of such animals.

BLOOD HORSE.

In the blood or racing kind, in which the trials have been by far the most extensive and successful, there is yet much to be done by proper care and judgment. The particular nature, sizes and dispositions, of the animal should be well attended to, so that the proportion of training exercise, labour, and exertion, may be properly suited to them; as it must be a wrong practice to give the large, strong, bony horses the same with those which are smaller, closer in their forms, and more active and spirited. In all cases, they require much

more mildness and temperance in their management than has been usually given in their breaking and training; for they are greatly disposed to become obstinate and sullen in their tempers when ill used in any way, and they recollect it with much exactness. Consequently, they should be as much indulged as possible, have suitably extensive grounds for the purpose of taking full exercise in, with fine air, and good food and water for their perfect support. The most proper sort of lands and situations for the practice are probably those that are not too level, but that have the most equal medium state of dryness at all times of the year, as having the best air, preserving the length of the strides of the horses in the most favourable manner in their exercisings, and as enabling them to run equally well on hilly and flat grounds. In their training, especially for the quick movements, they should be made to move their fore and hind legs in the same straight line, so that they may go in an easy manner to themselves without either labouring or being unsteady, but swimming along so as scarcely to appear to strike the surface, making long strikings without resting too much on the ground, the hind feet rising well, and the body low. The feet of the more young colts, while out in the pasture grounds, should be well looked to, as being apt to get out of shape by growing too long in the toes, which should, of course, be properly cut and rasped, so as to preserve them in the round, short, upright, state, with the heels rather open and high as in their original form; for, if this be neglected, other bad consequences may take place to the great injury of the animals.

Horses, that are trained for the turf, should always be kept rather lean than in high condition, as a too full conditioned horse can never run to any good purpose. All the exercisings, and other matters which are employed, are done almost wholly for bettering the wind, which is more necessary than strength of body, though both are requisite to the perfection of such horses.

HUNTING HORSES.

There is some difference in the circumstances of training the hunting or leaping horse from that of the racing sort. The former generally require less exercisings of the quick kinds, especially when occasionally used in the chase, walking or gentle riding for some hours in the day being mostly sufficient for the purpose. They may, also, be kept in somewhat, though not much, better condition than the racers; but neither of them should incline much to fatness. The hunters, therefore, though they stand in need of less severe ridings, they require a certain degree of them, and to be rather better kept than the racers, with the sort of keep which is the most suited for them. In their movements they should be accustomed to go in as close manner as may be without cutting, and especially in the hind legs; as, when they move too wide with them, it is unfavourable to continued power and exertion, each of the extremities moving as much as possible in the same straight line. When they have been thus trained in their exercising and going, they may be brought into the manner of leaping, which is the most proper and necessary.

With this view it is very material that they be so trained as to make their leaps in an easy, cool, and deliberate manner, so as to have nothing of hurry or intemperance about them; which method is much promoted by their being properly begun with, and ridden with sufficient boldness, so as never to be stopped or im-

peded in taking the necessary leaps of any kind,—for, where that is the case, the horse is sure to feel the same sort of disinclination, which may be productive of danger, and is always to be well guarded against: for, though some faults in leaping may, in the beginning, be committed by the best horses, they will soon correct them if well and boldly managed, while by timidity such faults must have a continual increase, until the horse becomes of no value whatever for his proper use. There are differences in the trainings for different sorts of leaps, which the horses should be brought to be well acquainted with, beginning with those of the flying kinds, or which have no upright impediments to surmount, in which the horse has only to be sure of their extents, and to rise as suitably as possible for them, a knowledge which is to be readily acquired by habit and practice. When these leaps have been perfectly attained, the standing leaps may be undertaken, in which size and height of fence are chiefly to be overcome; which are to be overleaped in the most certain, easy, and effectual manner by the horses being trained to bring themselves up, as near as can be, to the upright fence, whatever it may be before they make their efforts by rising on their hind legs to throw themselves over, as by such means their bodies will be far advanced in the leap before there is a necessity for taking up these parts, on which they rest, and make their main spring forward. The best mode of training for this purpose is at the leaping-bar, when properly prepared and made safe for such use, as in other ways the horses can seldom be induced to take such leaps in the fair and proper manner. At first, the bars should not have more height than just to cause the horses to leap, being gradually raised as they improve in their leaping, until they become quite steady in rearing up close to them, and throwing themselves over in a neat manner, at any certain height which they find they are capable of commanding. In this way they will soon be ready to take any sort of more cramped leaps with ease and safety; and be perfectly prepared for the purpose for which they are designed. These trainings should, at first, be performed without a rider, the horses being simply led up to the leaps.

While in training, except in the hunting season, these horses may have the usual keep; but at that time the hay should be of the most completely benty and dry kind that can be procured, being very fully made without having been ever wet by rain, or having run into any sort of heat in the stack, as when in such a state of hardness and freeness from moisture, as not being of so fattening a quality it is more favourable for the wind, and more lasting in its effects in supporting the animals; both which qualities are particularly wanted in the food of such horses. But any good strong sort of perfectly dry food of this nature will, probably, answer well in this use. In the oats, or other corn, which are to be employed with this intention, there should likewise be a great state of dryness, arising either from long keeping, or from drying on the kiln, or both,—as, by such very dry keep, any tendency to softness, and the throwing out too much perspiration, may be checked and prevented, and a hardness, firmness, and toughness of the constitution be produced, that is suitable and requisite for such horses.

ROAD HORSE.

In the road kind of horses, a less portion of training is requisite than in the hunters, and one different in its nature in several respects; as in the former action, step, and wind, are the points of most material consideration

In their action, or movement, these horses can scarcely be made to go in too direct a line, or too near in their legs and feet, if they do not cut, as they will be better supported by having their legs more under them; and the shorter and quicker, in some degree, they can be made to take their steps, the more lasting they will be, as not beating the ground so hard, or being less liable to tire than in overstepping. The wind is best secured by proper exercise and keep. As such horses are used in many ways, the particular sort of training should be made to suit the peculiar intention for which they are designed. One material point in their training, for whatever use they are intended, is, however, to render them perfectly steady and safe, as well as active, in as high a degree as possible.

LIGHT CARRIAGE AND TEAM HORSES.

In the light carriage and team horses a necessary degree of training will always be proper and useful, as has been already suggested. The former should be constantly so trained as to render them perfectly quiet and steady in harness of every sort, and so as to go tamely and correctly in the same step with each other, as when such horses are trained together in such light carriages in different steps there must be much inconvenience and disadvantage; as the quicker will have to drag on the slower, which cannot, of course, take their share in the pull; for no whipping or other forcing will have the effect, but must render the matter worse by increasing their distress. This evil is only to be remedied by training such horses to go together as nearly to suit each other in their steps as possible, by which they will become adapted for carriages of different degrees of swiftness, according to their agility and action, and will travel together in such carriages to the greatest advantage. Horses of these sorts are very apt, while young, to catch bad habits and tricks of many different kinds, which render them less valuable than they would otherwise be; they should, consequently, be prevented or corrected by training while in their more early states of bringing up, as such correction can seldom or ever be completely effected afterwards.

In the tillage team kind of horses, there would seem to be much to be done by judicious proper training, though very little has yet been, in general, attempted with them, they being, in most cases, suffered to take on their own particular habits and modes of action and going. It is, however, a matter of great moment for the farmer to have his teams of this sort, moving with a regular, steady, and rather active, pace; which is only to be acquired by proper training, as neither whipping or forcing, in any way, will have the desired effect for any length of time,—it is training alone that can produce it. Consequently, it is extremely material that such horses of this kind as are put together should not only have the greatest possible similarity of step, but a sameness of temper, and an equality of strength or power, as in such cases there will be the most facility and regularity in performing the work. In this business there is, of course, a great necessity for selecting, training, and coupling, such horses as can step the most perfectly together, as they must necessarily constitute the best teams for such uses. The great perfection to be aimed at is, that the horses in such teams should work with composure, and never want the lash, or even the motion of the reins; but should simply move in their natural step, and step well out together: for, though there may sometimes be a little benefit produced in training these animals, so as by forcing them, under light draughts, to move quicker; when

they come to have them fully, they will be sure to take to their natural step again. It is, indeed, difficult, in such cases, to make horses move either faster or slower. Therefore, the strong necessity is shewn, of having them trained, at first, to an exact steady step, which can be continued under all circumstances, as by such means the most useful and lasting tillage teams will be formed, whatever sort of horses may be employed for the purpose. And if by practice they can be made to have a little more alertness and quickness in such steppings, they will perform more work in a given time, and be more beneficial for the uses of the farmer. The natural step of such horses being every where so similar, is probably the chief reason why the extent of such labour of the tillage kinds, in different districts, is so nearly the same in equal spaces of tim .

In speaking on the subject of breaking horses, some useful directions for the managing of these team sorts, in their training have been given; and it must be repeated, that in all cases of training, temperate and mild m t ds are to be constantly pursued, as whipping or any species of severity are, in every sense, useless, and very prejudicial.

DRAY OR HEAVY TEAM HORSES.

In the heavy dray, or team and wagon kinds of horses, though training is certainly necessary, and of no little utility, yet it is not generally considered so very essential as in other cases. They are usually trained while they are rising to the proper age for such uses, after they have passed into other hands than those which raised them. The team work, which is the most suitable and proper in training such horses, is that which is greatly under the power and capacity of such horses to perform, as by such means they are never in any way baffled by too heavy pulls, so as to be injured thereby in their truth of draught, which is a point of very great importance in horses which have to move such very heavy weights. By putting such animals, while young and in the growing state, to weightier or more fixed pulls than they can easily manage, they are very liable to be much spoiled, or wholly ruined. On this account, it is extremely judicious, when undergoing the business of training, in farming teams, at about the age of two years, to let them have but light work in them, as not more than about a third or fourth of such team labour, since more severe work would not only retard their necessary growth, and put them out of the due forms, but more keep would be required, while the necessary size and weight would not be attained, and they would not, of course, be well suited to their intend d use. But by being thus lightly used in the tillage-teams, for two, three, or more years, the horses never afterwards feel any fear of being overpowered by weighty loads of any kind that they may be put to, in drays or in any other sorts of heavy teams.

As there is in such horses, for the most part, a slowness and heaviness in their movements, it is material, in the business of training them, to endeavour to give them a more expeditious and regular full step in their walking pace. This may perhaps be best done while they are working in the tillage teams, by putting such as evince too much inactivity and slowness of motion with other team horses that have a quicker and more full and regular step; by which means they will be most likely to acquire a more ready movement. No whipping will permanently produce such an effect; it must be the consequence of a natural or acquired step, which should be preserved, in all cases, by having the horses well suited to each

other in their moving powers. This is, perhaps, all that can be done by training; and the rest can only be the consequence of a better breed. For the use of the dray, or for any heavy team labour, power and weight are likewise wanting; but they should not, however, consist in fat, as some suppose, but in size, and strength, and fulness of muscle, as the former can give no power, and, consequently, must be disadvantageous.

In the training of the wagon variety of these horses, or those employed in the more heavy teams on the roads, the main point is, that of giving them a better step, and greater facility of movement; as by such improvements, they would be more perfectly adapted to the purposes to which they are applied.

It is very material, to have horses, in most cases, trained to move readily *sideways*, and to *rein back* easily and in a proper manner; but such modes of training are more particularly beneficial to those of the carriage, cart, and other similar kinds, as the former practice enables them to pass to either side, or to turn with much less difficulty and trouble, than would otherwise be the case; and has the effect of rendering them less apt to cut, bruise, and injure their legs and feet, by means of treading on them differently in going on a different side, narrowing, or in any other direction, as is often very necessary. The latter practice is not less necessary for horses in harness of all such sorts, as well as those of the saddle kind, as when not well learned and accustomed to rein back with ease and readiness, and in a steady manner, much disadvantage may arise, in many cases; as it is frequently required, that such horses should back to considerable distances, which they never perform in a properly easy manner, except where they have been early trained and habituated to it, by suitable methods.

SHOEING HORSES.

The principal necessity of this practice arises from the circumstance of the hurtful wearing down and destruction of the foot or hoof part of the horse, by its contact with hard surfaces; which injuries must be guarded against and prevented, by the use of thin plates of iron; the proper make and application of which constitute the art of shoeing. In the practice of this art, the natural form, and the several deviations from that form, in the feet of the animals, are the main points and circumstances to be regarded, in order to render it most useful and effectual.

The natural shape of the foot in young horses, that have not been shod, is constantly externally circular, though there may be a little difference, in different cases; and this form seems the best suited to the purposes which the foot has to sustain; as by enlarging the extent of surface to be rested on, firmness and stability are given to the animal, which are so material to his going, and which show the propriety and necessity of securing and preserving it in the same state as much as can possibly be done, by the appropriate construction and position of the shoe; so as that it may neither interrupt the natural action of the leg, by occasioning an impropriety of its manner of resting upon the road, nor confine nor restrain certain distending parts of the hoof.

In young horses, this hoof part of the foot is so firm and elastic in its nature, as to suffer no sort of disturbance, even in passing over the most rough and flinty roads; consequently, the only utility of putting on a shoe is, the preventing of its being too quickly rubbed down and reduced, by striking the ground; for which

purposes, the less width there is in its surface, the more favourable it will be, even if not much wider, in some cases, than just to admit the nails which fasten it. It also has the effect of reducing the weight, which is often a matter of much consequence; and likewise that of giving the foot a more firm hold of the ground, particularly on turfy or soft slippery surfaces. Race horses are usually shod with plates constructed in this way for the purpose of running.

It is the requisite nicety of fitting the shape of the shoe exactly to that of the foot or hoof of such young horses, that causes the great difficulty of the business of shoeing. For it is scarcely possible, notwithstanding the great apparent simplicity of the matter, to get the shoes of horses made perfectly to the shape of the feet or hoofs, as the workmen in this business, either from habit or other causes, are, in all cases, disposed to make them of less width at the quarters than the hoofs, as they believe that shape prevents cutting. The shoes should, however, in such cases, be always moulded in a more full circular manner, as where the contrary is the case, they are sure, in time, to narrow such quarter parts, and to induce all the evils that attend their unnatural states and forms.

It is evident, from the nature and effect of the shoe, that however well or scientifically the operation of shoeing may be executed, it must always be more or less hurtful to the foot or hoof, by the restriction and constraint which it necessarily occasions, by its being nailed to the part. Consequently, attempts have been properly made to fasten it without such injurious means, but hitherto, we believe, with little or no success. The natural and greatly useful inclining shape of the hoof downwards, both in the fore and hind parts, opposing much difficulty, if not impossibility, to the success of such endeavours, as it necessarily calls for some compression in the shoe, equally as hurtful as that of nailing.

In young horses, the feet are the most susceptible of being injured, while they are in their growing state, as from the period at which they have shoes first put upon them, until the time when they have completely reached the age of maturity; as by the confinement they give them, for several years, while under such circumstances, their natural proportionate growth and enlargement must, in some measure, be restricted and prevented; it is, consequently, necessary, on this being first done, that very great attention should be paid to the horse, to see that the shoes have the *full* size of the feet, and that new ones are put on sufficiently often, as at least once in every month or thereabouts; in which cases, the shoes advised for good feet or hoofs may be employed with propriety, taking care that every thing is rightly prepared, and that the shoes are shaped to the feet, and not the contrary, as is too much the case.

MANNER OF PREPARING THE SEVERAL PARTS OF THE HOOF FOR THE SHOE, IN THE NATURAL AND HEALTHY FORM AND STATE OF THE FOOT.

Where the foot or hoof is in this proper form or state, the preparation will be perfectly easy and simple, nothing more being necessary than simply to pare the wall or side parts where the shoe is to be placed, so as to be even and level, merely removing the decayed, scaly, surface portions, and taking away the ragged edges of the frog part, without in the least hollowing out or snipping the heels. This paring may be done in the neatest and most exact manner by the drawing-knife, though generally performed by the less manageable and more awkward tool, the buttress. The

inward returning part of the wall of the foot, that comes from the heel to the front of the frog, forms what are called the bars, which include the hind angular extremities of the sole, and wholly part them from the frog. These, when allowed to increase so as to reach the surface, as is naturally the case, have the effect, not only of relieving the wall and frog parts of the foot from much of the weight of the animal's body, but of giving considerable security and protection to such parts of it, in consequence of their more resisting and more solid nature; if, therefore, they be cut, opened, or pared away, as is often, through ignorance, the case, much harm will be done, under whatever idea it may be performed.

As the frog is evidently designed to sustain and take off a part of the pressure falling on the foot, as well as to defend and fill up certain parts of it, and give elasticity to its hinder portions, the usual mode of paring it quite down to the living parts, in shoeing, must set aside all such natural uses, and be highly improper. The practice of putting on thick-heeled shoes, by raising the foot, has the same mischievous effect, and tends to the production of disease. Nothing more should ever, on any account, be taken off, in fitting the shoe, in such cases, than barely the surface parts; and, consequently, the too common practice of putting on the shoe in its hot state, so as to burn down the hoof till it fits the former, is highly objectionable and hurtful, and should never be permitted on any consideration whatever.

PROPER SHOES FOR PERFECT HOOFS.

Where the form of the hoof is perfect and natural, the shoe should not have more than three-fourths of an inch in breadth; being formed all round perfectly flat, and exactly of the same thickness, as by being the same in the fore and hind parts, it will rest in the most natural manner of the foot upon any surface on which it may be placed. Such shoes are, besides, light, easy, and pleasant for the horses. It was, for some time, supposed to be an improvement, in promoting the descent and consequent natural pressure on the frog, to have the shoes made very thin at the heels, but it was soon found, that however reasonable the notion might be, the mode of effecting it was wholly wrong; as by giving so much more thickness to the toes than the heels, the feet were wholly put out of their natural order of resting on the surface, and many bad effects were thus produced; an endeavour to remedy some of which was made, by lowering the toe part of the hoof, and suffering the heel part to remain without being touched; but the success was equally indifferent, as the increasing growth of the heels had precisely the same consequence as a shoe with more thickness of heel. Nor was the invention of pressure on the frog, by artificial means, attended with more favourable results; so that nothing has yet been, we believe, discovered, of any practical utility for this purpose.

In these cases, for running horses, and those of the road kind, the best, most advantageous, and common weights of the shoes may be, in the first, from about four to five ounces; and in the last, from ten or twelve to eighteen ounces; making them properly narrow and flat, with the same thickness in all parts.

PROPER SHOES FOR THE ALTERED AND IMPERFECT FORMS OF HOOFS.

There are certain causes acting on the hoof parts of the feet of horses, which produce different modifications in the forms and aspects of the sole parts of them. The two which are the most particular, are either a too great hollow-

ness or dishing in them; or else a too great fulness or roundness. The first usually happens where there is a great dryness and strength in the wall of the hoof, and where, from the want of pressure in the shoes, the heels rise high, by which the horny sole is impelled upwards, so as to produce a certain degree of pain and uneasiness in the sensible sole directly above it. This state is often attended with much disease, and ultimate contraction in the heels. In this state of the foot, the same sort of shoe may be made use of as has been advised for the perfect foot; in fitting which, the heels may be pared as low as they can be, and the quarter worked over by the rasp.

But in the second, where there is a flatness or roundness of the sole part of the foot, a shoe of a very different kind must be made use of. In this state, which is occasionally produced by an inflammatory action in the parts, termed foundered, there is seldom any remedy. But when the fulness proceeds from improper shoeing, something in different cases is capable of being done, as the wall of the hoof is here thin and weak, and as the mischief arises principally from the local pressure on them by hollow web shoes, they are, of course, to be nicely formed in such respects. The heels, in such cases, have little growth, in proportion to the other parts of the foot, their increase being prevented by the weight of the body, and the new horny material being more largely forced from the heel to the toe part of the hoof. In fitting the shoe, in this case, it is, consequently, plain, that the heels should never be at all reduced by paring, but the operation be solely confined to the toe part, which should be preserved as short as circumstances will admit. There is there, on account of the increased pressure from the less height of the heel parts, a largeness, hardness, and soundness, in the frogs.

In such roundness of the hoofs, the sole parts having a more full exposure, than in the natural state, a more perfect defence becomes necessary. A shoe of greater breadth is, of course, proper; the inner surface of which should answer somewhat to the roundness of the sole. That surface which rests on the sole may be flat, as formed by inclining it regularly from the outer to the inner edge of the web, a proper space being left between the sole and the shoe. The application of the hot shoe, in fitting, is here to be carefully avoided. The common practice, in such cases, is, to apply a bar shoe, which, when well constructed and carefully put on, may lessen the mischief, in a temporary manner; but as they are, in general, badly constructed, by having the heel parts formed in a hollow method, the foot is put, as it were, into a basin, by which the compression on the heel is still preserved, though in somewhat a different manner, and the complaint in that way is ultimately rendered worse. Of course, this sort of shoe should never be employed, except in such cases of corns, which, from their badness, are to be wholly extirpated by paring away the heel.

PROPER SHOES FOR PREVENTING, CORRECTING, AND REMOVING ACCIDENTS WITH, AND FAULTS IN, THE FEET.

Many sorts of shoes have been invented and proposed at different times, with these different views, but, we believe, with no very full success; the feet of the horses being generally left nearly as they were, or else rendered worse. With the intention of avoiding contractions in the feet and heels of horses, a shoe was lately advised, which was little different from the common one, only in having a sort of

clip catch proceeding from the inner edge of it at each heel, so as to turn over the bar of it, and restrain it from moving inwardly towards the frog. This shoe was, however, far from perfectly answering the desired purpose, as the close manner in which it confined the bars overlapped, wholly prevented the natural dispanding power of the heels; and by causing them to be constantly kept on the stretch in an outward direction, produced equal pain and inconvenience to the horse, as when they were compressed inwardly towards each other. Therefore the endeavours to induce sudden alterations in the forms of the hoofs will, in all cases, be found to be wholly ineffectual, if not hurtful. They can, indeed, be of no utility whatever; as from the hardness of the horny substance, and the change having come on by slow degrees, the relief must be also gradual, and cannot be brought about by sudden and forcing methods.

In order to remove the bad effects of horses turning their feet out in either lateral direction, so as to be very faulty in striking and cutting the fetlock joints of the legs of the different sides in travelling; it has been usual to have the shoe made of less breadth than the foot on the inner side, which may be, in some respects, useful for the purpose. It has also been endeavoured, with the same view, to put the foot in a straight direction, by having the shoe made thicker on the side that opposes that to which the toe may have an inclination; but this may, in some measure, inconvenience the joints just above the feet, by displacing them from the usual straight line in which they move, and can only be in any way proper in the case of young horses, before the parts have become rigidly fixed and incapable of change.

It is never proper, in any sort of foot, to have the shoe longer than the heels, as it creates danger in the gait of the animal, by the toe of the hind foot being liable to be caught by the heel of the fore one, and the horse being thereby thrown down, unless prevented by the forcing off of the shoe. This circumstance is, therefore, necessary to be well attended to, especially in road horses.

PROPER SHOES FOR HEAVY TEAM HORSES.

The common manner of shoeing such large heavy horses has hitherto been highly improper and injurious in different ways. The shoes generally employed being so extremely heavy, their breadth so great, and being made so in the webs, as in a great measure to cover the whole of the sole parts of the feet, together with their roundness on the surface towards the ground, are extremely hurtful and improper, as the state of the roads permit only a very small part of them to come in contact with them; and, consequently, the horses cannot possibly stand so securely, firmly, and steadily, as they ought to do, nor have so perfect a hold for their feet, when putting out their strength in drawing weighty loads; but they are, of course, continually slipping about, without the power of exerting their strength in a natural manner. Such a load of iron in them is, therefore, without doubt, not only quite unnecessary and useless, but greatly inconvenient, as if shoes with narrow plates be ever at all attended with advantage, they are peculiarly so in such heavy horses, as they must give their feet a much greater and better hold of the earth's surface, and, consequently, tend to render them more secure in the keeping of their feet. This great breadth of the shoe is believed, by some, to be requisite for keeping them on the feet, and preventing their twisting;

but far from promoting such an effect, it is much more likely to have the contrary tendency, in consequence of the great load of metal which they contain; while the shoes with narrow plates, by resting more closely on the hoofs, and being free from any intervening hollow spaces between them, must of necessity be less subject to be twisted than those of the contrary make. By having the ground surfaces of the shoes of the horses made a little hollow, they would have a much firmer hold of the roads, and keep them better on their legs.

The weight of shoe which is most suitable and effectual in withstanding the force, pressure, and beating, of the roads and pavements in the different sizes and weights of the light carriage and heavy team horses, are, in the former, supposed to be from about twenty to thirty ounces, or a very little more; and, in the latter, from about twenty-eight ounces to two pounds and a-half, or thereabouts, instead of the heavy loads of iron that have been usually attached to their feet without either necessity or utility. In lessening the breadth of such shoes they may be rendered thicker, without any increase of the weight.

From what has been observed respecting the nature of the feet of the horse, and of the shoes which are the most beneficial in covering them, it must be evident that much yet remains to be done before the practice of shoeing be brought to that state of certainty and perfection which so important and useful an art requires.

MODES OF NAILING OR FIXING THE SHOES ON THE FEET.

With a view to the mode of fastening the shoes of horses on their feet by nails, it is usual in forging or forming them to cut a narrow groove quite round near the outer edge of the lower surfaces of the shoes in order to the taking in of the heads of the nails, and to the partially concealing and protecting them. This is the common method of proceeding in this country, and is not unfrequently termed *fullering* by the workmen; but, in some other countries, this is not the practice, but the nailing surface of the shoe is left perfectly level and smooth, separate holes being punched in it for taking and securing the heads of the nails. Of the two practices the latter would seem to have the advantage, in respect to usefulness, though less neat in appearance, as the heads of the nails are perfectly surrounded in their defence,—while, in the former practice, the fullering leaves two of the sides of the nail's heads wholly unprotected, and, of course, more subject to be drawn or destroyed by striking against some hard substances in travelling. The latter method, also, by leaving the iron plate of a more regular thickness throughout the whole, occasions it to last longer.

In the manner of nailing on the shoes there is likewise an equal diversity of practice. It is the method of the workman, in this country, to drive the nails so as their points may come out as high up in the wall part of the foot as possible, little of them being left for clenching; consequently, to avoid the danger of reaching the quick, the nail points are placed as near the outside of the wall of the foot as can be, driving them directly upwards to more than half the height of the foot part, and by coming out so high they must be more or less hurtful from the increasing sensibility of such parts, as well as from the hazard in driving them. In other countries a quite contrary method is made use of; the nails are neither driven up to nearly such a height, or put so near the out-

side of the wall parts. They are inserted more towards the border of the sole part, and driven in such an upward slanting manner towards the outside as to appear at not more than a third part of an inch higher than the bottom treading part of the shod foot,—by which means they hold by a larger body of the horny parts of the foot, and are not less firm and secure; while the danger and inconvenience to the higher and more sensible parts of the foot are thus almost wholly removed.

In regard to the proper nailing on the shoes, it should be done, in some degree, according to the nature of the hoof, and the state of the wall or crust, so as always to make and distribute the nails and the holes in the shoes, in such a manner as that they may pass through, and have their hold in the firm, sound, and solid, horny outside parts of the feet, and thereby prevent their too great increase in number, so as to break and destroy such outside horny parts in too extensive a manner, as a few nails so driven are fully sufficient for the purpose in almost all cases. The nails, in all cases, should be made rather fine in their stem parts, and of the toughest sort of iron, being driven up to a medium height in the crust parts of the feet, as being the safest, the points before clenching being so weakened on the under sides as to turn well over, and rivet in a secure manner without rising. The head parts should have a proper thinness, so as to fit well into the fullers of the shoes,—as, when they overspread too much at the top, they are readily broken off in going on rough stony surfaces, and are subject to be bent and drawn, so as to loosen the shoes. They should all be driven as much as can be, in the same direction, to prevent injury to the hoofs by tearing their horny parts. These modes of nailing the shoes to the feet of horses should be well considered, as improvement in the manner of safely, readily, and perfectly, fastening them is much wanted in the practice of shoeing.

METHODS OF APPROPRIATE SHOEING IN DIFFERENT CASES.

The principles of shoeing having been somewhat laid down in considering the natural form and condition of the foot, the alterations that are produced in it by different causes, and the shapes and sorts of shoes most suitable in different cases and circumstances, with the means of nailing and fixing them on, we may now enter upon the nature of shoeing in different states of the foot with much propriety and effect. It is evident that, in the cases of the naturally-formed feet, nothing more will be required than to have the shoes perfectly shaped to them in every respect, and so as to be neither larger nor smaller in their dimensions; to have the parts for the resting of the shoes as little meddled with as possible by paring or cutting them away, and by having them fixed and nailed on the horses' feet in the careful and secure manner that has been described; as by such means they will have every possible security and advantage in their feet, and their manner of going on the roads, of whatever nature they may be. It is the neglect of fitting the shoes properly and correctly to the feet of horses which occasions most of the evils and mischiefs of shoeing, as by every error in this practice injury will be more or less produced.

In cases of altered or imperfectly-formed feet, it will be necessary to regulate the business of shoeing by the nature of the alteration which has taken place. When there is too much hollowness in the sole parts, with narrowness in the heels, more cutting and paring down, and rendering the heels open, will be required than in other cases, as it is

only by such means frequently used, and keeping them soft by simple stuffing, that any benefit can be produced.

On the contrary, where there is too much flatness and roundness in the feet, the sole and frog being high and little protected by the hoofs, with weak divided heels, the shoeing must be so managed as to have the shoe the thickest on the outer sides of the feet, dishing inwardly so as to be prevented from resting on the tender soles. In such states, to prevent the separation in the heels, the use of bar-shoeing upon some soft leathery or felty substance is sometimes found beneficial in protecting and preserving such feet.

In shoeing with a view to prevent cutting, as it is the improper manner in which the standing feet and legs meet that causes the moving ones to do the mischief, the great art that is necessary consists in contriving that the standing legs should have positions, as much as possible, out of the ways of those that are moving; and as, in the different practices usual in performing such work, one has the effect of bringing the body of the animal and the weight it carries, to rest beyond the upright line of the standing foot outwardly, and the other inwardly; it must be plain that when the work is done higher on the inside than the out, it will tend to bend the leg outwards, and the body in the same line; and when done the highest on the outside, the top parts of the leg and the body will be brought inwards; consequently, that the main point in shoeing, in such cases, is to give the means of properly throwing the weight of the body from the standing feet, by suitably placing on such shoes as are necessary; when the more weight the horses carry, the more removed will be their moving feet, in their positions, from those on which they stand.

The common method of putting on shoes a little hollowed out on the insides of the feet, paring the feet away on the outsides, and forming the plates of the shoes thicker, and occasionally levelled, on the inner sides, so as to raise the insides greatly higher than the outer ones, are, in all cases, quite wrong, and must always add to the mischief.

MANAGING HORSES IN RAISING THEM.

In the management of horses, many points are necessary to be well regarded and carefully attended to, in order to preserve and keep them up in the best manner; as the nature of their confinement in stables, the proper cleaning of them, and the keep, water, and exercise, suitable for them.

NATURE AND EFFECTS OF CONFINEMENT.

It cannot but be evident that, in the state of domestication, the natural habits and customs of the young horse suffer much change and alteration in many respects, which must greatly hurt and inconvenience him until he become perfectly familiarized and accustomed to them. He soon feels very sensibly the injury and great want of free air and ventilation when shut up in too confined places; of course, the great necessity of well-aired houses and places of this kind are fully shewn in the keeping of such animals, to preserve them from the noxious effects of the different effluvia that rise in them. Light is almost equally necessary and important in the places where horses are kept, as without it they are liable to become blind. Proper widths, lengths, heights, and forms of the bottoms of the standings, in such places are, likewise, to be well regarded, where they are divided,—as, without proper attention in these respects, the animals may sus-

tain great injury in quickly turning by kicking each other, and in their manner of standing; the former should, therefore, always be sufficiently high, large, and lengthy,—and the latter very little, if any, more raised in the front than the hind parts, by which a variety of inconveniences and ill consequences to the feet and legs of the animals will be prevented. For the keeping light carriage and team horses, the divisions that confine them are mostly either trifling or none at all; in the former it is commonly done by round wooden bars, with short-end chains at the heads and posts for their suspension, which, when confined by such chains in too limited a manner, and the horses in lying get themselves crosswise under them, they may receive injury in their backs in suddenly rising: it is, therefore, necessary to guard against such accidents by giving them more play, so as to remove the danger. Where there are no divisions of any kind, it is scarcely possible to keep the horses, without the danger of injury from kicks, or to prevent them from being inconvenienced in other ways, as by want of room to lie properly down to rest; and besides the uncertainty of their getting their proper feeds. It is, therefore, the best and safest practice, in all cases, to have the standings properly divided in the boarded manner.

NATURE OF FEEDING, FODDERING, FOOD, AND WATERING HORSES.

In the feeding and foddering of horses, it is necessary to have in mind, that their stomachs, as they do not ruminate or re-chew their food, are much smaller than where that is the case, and consist simply of an undivided single bag, they, of course, require much less food to be given at a time; but such small quantities should be more frequently repeated, in order to their perfect support, so that they may be almost continually eating while in the state of rest. As their food is not brought up again to be more reduced, it passes more readily into the bowels, which are very large for its reception and necessary detention. They have in their stomachs an elastic power, which adapts them in capacity to the quantities of food they receive into them; consequently, they stand much less in need of simple distending substances in foddering than many other animals, as they may be said to be always full with what has been taken into them. There being no power of regurgitating, or throwing up the contents of their stomachs, in these animals, on account of the peculiarity of the construction of the parts, is a circumstance which strongly enforces the propriety and necessity of well regulating and distributing the proportion of food to be given at once in foddering. In all kinds of horses these should constantly be well attended to, but particularly so in the light carriage and heavy team sorts. It is a point which should, in some measure, be directed and regulated by the amount of the labour or exercise which the animals have to perform. Where these are great or severe, it should be much more than where the contrary is the case. The exact quantities will depend on a variety of different matters; but from about sixteen to twenty pounds of hay, or from twenty-five to thirty pounds of cut chaff and hay in mixture, with from a peck to a peck and a-half of oats, in the day will, in most cases, be sufficient. It is always useful and advantageous to feed horses with proper sorts of food, as when it is bad, or in an improper state, it is very prejudicial to them. Thus, new unfermented hay should never be given to horses, as it is very hurtful to their health, and productive of mischief in different ways.

Chaff and straw that has been fresh cut are useful as dry keep for filling the stomach, but afford little support. Carrots, where they can be properly used, are valuable, as being healthy, and giving good support and wind. Other vegetable roots, in their prepared and unprepared states, have been found beneficial in feeding horses, especially the team working kinds, as tending to keep them more free from swellings in the legs; this is said to be the case with the Swedish turnip, but the potato has probably been more used in this sort of feeding. A small quantity of either may often prove very serviceable. In some cases, it is of much advantage to have oats in the straw cut and given in the manner of chaff; and, in the spring, where horses cannot be turned into the pastures, it is of much use, occasionally, to fodder them, in rather a sparing manner, with green tares, clover, and other such food, as they promote the health of the animals greatly. But, whatever the nature of the food may be, it should always be used, in foddering such animals, in small quantities at a time, and frequently; as by that means waste is prevented, and it is less spoiled by being blown upon.

In giving horses water, that which is of the more soft kind is to be used, as they mostly prefer it, drinking it before other sorts, even when it is fouled. In the natural state of feeding on the pasture herbage but little water is drank, in comparison to what is taken in the state of confinement in the house; and, though it is very frequently the custom to let them have a full quantity of water twice in the day only; it would, probably, be better if they had it more often, in less quantity at each time. The giving horses warm water is, in all cases, unnatural and improper, though often practised with those of the hunting and some other kinds, as it tends to relax and weaken, as well as to produce other bad effects. The too frequent custom of pushing and briskly riding horses that have just drank, in the notion of warming the fluid within them, is perfectly absurd and foolish, and tends to produce inconvenience and injury. And the equally unfounded notion of not letting horses have as much water as they want, through the fear of endangering their wind, is not less absurd, as that evil is more likely to arise from their being debarred of the full supplies necessary than the contrary, as dry keep requires to be much moistened to promote its conversion into nourishment. The practice of suffering horses to fast too long before they are put to labour is hurtful and disadvantageous in many cases, as it has the effect of causing in them a degree of weakness and faintness, which are unfavourable for the execution of it, though it is mostly the custom to have racing and hunting horses kept several hours fasting before they undertake their respective tasks, as it would be improper to have them too full; but, even in these cases, it may be carried too far, especially in the latter, where the exertions are so long and so considerable. Besides, too long want of food, accompanied with such severe exertion, is apt to lessen the power of the stomach for afterwards taking it in properly, which adds still further to the mischief.

NECESSARY CLEANING, AND THE REMOVING OF THE NASTINESS ABOUT HORSES.

The necessity for proper cleaning, in the case of the horse, is equal to that of any other part of the management which relates to that animal, and such cleaning requires to be regularly and correctly executed. The usual manner of performing it is so well understood, that it need not be noticed any farther than jnst to remark, that at the two periods of the year, when the

heat is beginning and declining, and the horse changing his coat, it is improper to use the means of currycombing too freely, as it may displace the hair in a too sudden and hurtful manner; it is, therefore, better at those periods to have only the brush and straw wisp gently employed for the purpose. There is a very hurtful practice in cleaning horses that have been hard run and heated in work, by instantly washing them in ponds or other waters, into which they are ridden sufficiently deep for the purpose, and then leaving them to get dry of their own accord. The danger of this practice is often very great from the cold and stiffness which are produced, so that it should either never be used, or when employed the horses should be immediately dried in a perfect manner by good wisp rubbing.

No sort of moist *dungy* matters should ever be suffered to remain long about horses, as the vapour that is thrown off from them is very prejudicial. All the filth from the different parts of the standings should, likewise, be frequently washed and cleared away, as they accumulate from the breathings and other discharges of the horses; the bits, or other parts of the bridles, and every thing about them, should be kept as clean and dry as possible, as being so greatly conducive to their health. After exercise, it is always proper to have the feet examined, washed, and picked, if necessary; and if they are hard or dry, they should be stuffed with some clayey substance, but not with cow-dung, as is too usual a practice, that having a tendency to injure and destroy the parts to which it is applied. Most of the littery substances employed as bedding are usefully rolled up to the head parts of the standings, or wholly taken away, in the day-time, so that the horses may rest with their feet on the naked stones, or other matters, and thereby be much benefited in their legs and hoofs, and in other ways. The staling of horses, when they are inclined, should never, on any account, be prevented by forcing them on if at work, as it is greatly hurtful; but, on the contrary, it should always be encouraged by whistling and gentle usage, which promotes it, from long custom, in the animals. The keeping of certain kinds of animals among horses, in the yards and other places, is rather disadvantageous than beneficial, as the scent and stench which are left disgust them with their food.

SECTION VII.—*Necessary Attention and Practices in feeding and supporting Horses in different Intentions, at different Seasons of the Year, by Dry-Keep and Grass, and soiling with Green Food.*

THE feeding and supporting horses of all kinds, and under every circumstance, in the best and most beneficial and reasonable manner, is a matter of the greatest moment and consideration to those engaged in keeping such stock. In the performing of this business to the most advantage in different respects, several particulars are to be well weighed, and taken into the account, such as the nature and state of the animal's capacity for taking in the food, the kinds of it that are most suitable, and the means by which it affords the most nourishment and support to the system. It has been seen that the stomachs of these animals are so formed as to be capable of suiting themselves to the proportions of food which are taken in, and, of course, that there is less necessity for the use of simply distending matters in the practices of feeding them; while it is very material that all the substances which are employed in this way be well and intimately mixed, not only with the saliva but the gastric

fluid, as they are so readily thrown into the alimentary canal, whence the nourishment yielded is much taken up for their support. On these several accounts, it plainly appears, that whatever the nature of the dry food or keep which is given to horses for their support may be, it should always be of a good quality; be so managed in its preparation for such use, as to require much chewing and reduction by the teeth of the animals, before it is swallowed; and that it be supplied to them in not too large portions at a time, but rather frequently, as by such means it will have the fullest effects in nourishing them, be the most lasting, and, consequently, prove the most effectual in keeping them in proper order and condition.

SORTS OF DRY KEEP.

In the dry food which is made use of in the feeding of horses, there are several different forms and kinds, as those of the substances in their natural states, cut meat of various sorts, corn or grain in the proper full manner, pulse in the full or partly divided conditions, and the meals of many kinds of grains and pulse, either in the more rough or fine powdery forms; but hay and corn have been by far the most usually employed. From the great expense of hay of every sort, in most situations and places, different kinds of cut meat have been commonly, however, substituted, either wholly or partially, in its place; with each of which, corn or pulse of some kind is constantly found necessary to be combined, and given in the whole or reduced state, in order to produce the proper condition for work in the animals; and the meals of several such matters have occasionally been had recourse to, in mixture with the different cut meats, with the view of being more economical, in consequence of the smallness of the quantities required, as well as from theirmore full and beneficial effects. And probably the modes of mixture of corn or pulse with chaffs or cut meats, and of meals with the last, when properly combined, will be found to be the most efficient as well as the most saving and advantageous of any that can be pursued in the supporting of horses for work of the team or other kinds. Where corn is to be joined with cut fodder, in feeding horses, much advantage and convenience may be gained, by reducing the sheaf oats at once into such a state, as not only the work of threshing may be thereby wholly avoided, but the food would be given all at a time, and trouble be saved in that way. The cutting of hay or straw, merely with the view of making them go farther in the feeding, as is sometimes supposed, has no benefit whatever attending it, as the difference will probably not repay the expense and trouble; while disadvantage may attend it, in having it reduced so small as not to require the necessary chewing of it in the feeding of the animals, which is well ascertained to be a point of very great importance and utility, as it respects their nourishment and support. In cutting straw or any other such substance, for intermixing with meals of any kind, in this sort of feeding, it should not be done in too small a manner, probably from an inch to an inch and a half or two inches, are the best lengths for the purpose, as they render it quite necessary for the horses to chew them well before they pass them down into their stomachs, by which process they are the most perfectly blended with the saliva in their mouths, and the best fitted for being afterwards acted upon, de-composed, and digested, by the gastric liquid, with which they become further mixed previously to their being lodged in the canal of the bowels, where much of the nourishing matter, thus prepared, is taken up by the mouths of appropriate glandular vessels,

and carried into the system for the support of the animals. In this way, besides the benefit of the food being more perfectly chewed and mixed with these fluids, much time and labour are also saved in its preparation. Mr. Vancouver has long since mentioned a somewhat similar method of cutting such substances, and mixing mealy matters with them, as practised in sustaining farm and wagon horses, in their long and laborious journeys in America. Such cut strawy substances have there a mixture of the meal of rye, oat, and Indian corn, blended with them, in the quantity of about half a peck, to two and a half or three pecks of the cut strawy materials. The manner of mixing it is, by spreading the cut chaffy substance thinly and equally in the bottoms of the mangers, or shallow troughs attached to the wagons, to about the thickness of two and a half or three inches; then moistening it all over in the same manner, so as not to make it too wet in any part; the meal, in a fine state, is then strewed over and mixed with it, stirring them both well together, until every shred of the cut material is found to be covered, or, as it were, frosted over by the meal. The mealy meat thus prepared is eaten with the greatest avidity by the horses; and has the most powerful effects in enabling them to support the extremely hard labour of such journeys, and at the same time keeping them in high condition. Such a method of feeding team horses could not fail of being equally useful and proper in this country, while it would have the convenience of the whole being given to the animals at once.

In that country, it is principally the stiff, strong, rye, strawy material, that is cut and used in this manner; but in this, various strawy substances are cut and employed for the purpose of feeding horses, as those of wheat, oats, beans, and others, of different kinds, with their several offal matters, as the caving chaffs, &c., which, in a great measure, are found to prevent the necessity for hay, though some small portion is mostly used at the same time. Hay, too, is sometimes cut, in this method of feeding such animals. But as it is not yet much the practice to mix meals with such cut meats, corn or beans whole, or the latter split, in some cases, are made use of with them; and decidedly found to be the most beneficial keep for working horses. They do not answer in the reduced powdery state, when given alone, for the reasons that have been stated above, as, though the horses may look well and in condition, when so fed, they will be found weak, and want that firmness of flesh which is necessary for performing work of the more laborious kinds.

There are many other sorts of dry keep which will preserve idle horses in good condition, but on which they cannot work.

For working horses, the best sorts of dry keep are probably those of properly cut matters of the straw kinds, given in connexion with a few dry oats or beans in the whole state, or with which meals have been combined, in the above manner, in a small proportion, as they will be found to be the cheapest and the most useful.

Much saving may be made by having such matters given to the horses in a properly small quantity at a time, as where too much is put at once before them, there will be not only waste made by them, but they will eat it in a less perfect manner, and have less benefit from it in their support.

In the feeding of horses for particular purposes, as racing, hunting, the road, the nature of the dry keep must be regulated by that of the use to which it is to be put; the two first require it to be of a peculiar quality, and very

hard and dry, as hay which has been made under particular circumstances, and of corn that has been artificially rendered particularly dry. The last may be well supported by cut meat of the above kinds, corn in a due quantity, and a little clover or saint-foin hay.

GRASS-FEEDING, OR KEEP.

In the summer season, most horses will do well, and get into condition in the pastures; but they cannot stand much work without corn in some form or other. Team horses of different kinds are not unusually turned into the pastures in the night-time, when, by having a small allowance of corn continued to them, with a little cut chaff, they are enabled nearly, if not wholly, to execute their usual extent of work in the day. The pastures which are the most proper for horses, are those of the more dry, hard, and benty, or less soft grassy kinds, as such grasses pass less readily through their bowels than those of the more rich, herby, soft descriptions, and are, therefore, better suited as keep with this intention, producing likewise less disposition to sweat in an improper manner. The working horses are best removed from the pastures as autumn approaches, and the grasses become more weak and soft. On first turning horses into the pastures, it is often useful to do it in a gradual manner.

SUMMER SOILING KEEP,

The practice of feeding horses in the summer months, in the yards or other proper places, by means of giving different kinds of succulent, cut, green food to them, is, without doubt, worthy of attention, as rendering the consumption of such food less wasted, supporting the animals very efficiently, and providing a large supply of useful manure, which would otherwise be lost. In its application, so as to be the most extensively beneficial, several points and circumstances are necessary to be well considered and regarded, such as the nature and state of the food which is employed, the manner of serving it out to the animals, the substances which are combined with it, and the littery matters which are made use of with it, with the view of increasing the quantity of manure.

The sorts of green food which are mostly made use of in this way, for horses, are those of tares, red clover, saint-foin, and lucern; but several others will answer the purpose, where they can be had in sufficient quantity; as rye-grass, and some other coarse grasses and plants. The states in which they are used to most advantage, in this kind of feeding, are, in all the sorts, when they have advanced considerably towards the state of maturity or ripeness, as the tares in the pod, and the others when they have flowered, and, in some measure, formed their seeds. In the manner of giving them to be consumed by the horses, they are commonly cut fresh every day or two, brought to the houses or yards, and put in suitably small quantities at a time into cribs in the stalls or yards, which are always to be kept perfectly sweet and clean for receiving them. Some think the latter more favourable than the former, as the animals are more in the open air, and feed better. Such food is never to be so kept as to acquire any sort of bad taste or smell; but, in some cases, the animals eat it better when a little withered. The dry matters that are, in many cases, usefully given along with it, with a view of correcting its too great tendency to pass too quickly through the bowels, and thereby be prevented from affording the proper support for working horses, are the various kinds of cut chaffy meats, which have been noticed above, in a due proportion. A

small portion of such dry materials often answers the purpose very completely, and is of much service in this sort of horse-keeping. In the substances which are employed for litter, and the forming of manure, any kind of straw, stubble, or dried fern, will be proper, having it carefully spread under the animals, or over the yards and feeding places, so as to drink up the urine and other liquids, as much as possible, and hasten their conversion into manure.

Horses, in being soiled with tares, require almost an equal quantity of cut chaffy meat to be used along with them, in order to preserve their health, and support them for work in the best manner; but where the tares are much podded, less cut meat will be required.

With the other kinds of green food, when used as soiling keep for horses, less quantities of cut meat will be sufficient for the purpose, as from a third to a fourth part of the quantities of the green foods employed, with which they will, in general, be found to produce the fullest and most advantageous effects, in supporting the animals for the purpose of working in teams.

The proportions of such soiling foods which are given, should never be too large at one time, but be more frequently repeated; as in that way, not only is the food more beneficial, but there is much less waste sustained in the feeding.

These several sorts of green crops, when made use of in the way of soiling horses, in the proper manner, are a cheap and abundant sort of keep, and are extremely useful in supporting such horses as are in work, keeping them quite fit for labour at little expense, at the same time, that they cause much manure to be raised, where the necessary attention is bestowed, in having the stalls and yards regularly and properly littered down, and thrown up on the dung heaps. Some persons have affected to think, that the manure provided in this manner of horse-keeping is less valuable than that which is gained in other ways, by the saline particles being more dissipated by the heat of the weather; but it is not on any small portion of saline matters that the substances may contain, that their virtues, as manure, materially depends, but upon the quantities of vegetable and mucilaginous matter, which are animalized in passing through the bowels of the animals, and converted by the action of the urine and other liquids on the strawy substances used as litter. And as all such sorts of green horse-soiling food abound much with rich juices and such vegetable mucilage, the manure must, of necessity, be good, as the season has nothing, or very little, to do with it.

The nature of soiling has been considered more fully, in speaking of neat cattle, as may be seen under that head.

Section VIII.—*Necessary Circumstances to be attended to in selecting, purchasing, providing, and disposing, of Horses.*

There are several circumstances which ought to be well known and attended to, in managing this sort of business, in a proper and advantageous manner, and so as to avoid being deceived and imposed upon.

EXAMINATION OF HORSES.

The first thing which is proper to be done in providing such animals, is, carefully to examine them in their different parts. On finding that they are perfectly quiet, they should be spoken to in a pleasant manner, and then the examiner should go up to them in the stall, on the

near side, before they are brought out, and feel the state of the forehands, examine the eyes, the mouths, and the countenances in general; when, by turning their heads a little, the curve of the necks, the heights of the forehands, and the positions of the shoulders and the fore-arms, are to be well ascertained; from which he should descend to the legs and feet, so as to fully determine the condition of every part, from above as well as below, and within and without, by the finger, and carefully notice the perfect state of the knees. Having thus decided in regard to the fore-trains, the hand and the eye may be carried and glanced over the backs, girthing places, carcasses, and loins; and thence directed to the hinder quarters, the setting on of the tails, the legs, and hind feet; seeing how far and how exactly they agree in each, and in every respect, of form and shape, with the rules of good figure and proportion. The last two parts will require an equally minute attention as any of the others, the insides or hollows of the hocks being particularly regarded, as denoting, with the greatest certainty, the bad consequences of severe labour. Then by taking views of the contrary sides of the horses, the stable examination of them will have been sufficiently performed.

No persons who are usually employed about the horses should, on any account, be suffered to be with them in the stalls, while they are examined, in order that they may be seen in their real states, and without constraint, and that the condition of their fore feet may be shown; for if there is any tenderness in them, they will stand with them in an extended manner, and keep moving them first one way and then another.

SHEWING OF HORSES.

When the horses are brought out and shewn in the halters, no whips nor any sort of management by figging or stimulating the end guts of them should be allowed, as they render them irritable, alter their appearances, and cause them to go in a wider manner behind than is natural.

Horses, when they are shewn, should always be placed on a level surface, as it is usual to have them put with the fore legs and feet in an elevated position, in order that the shoulders may seem to be thrown more backwards, and that the horses may have the appearance of being higher than is really the case; but by seeing them on the level, the true form and make of such parts will be readily discovered; and it is very material, especially in road horses, that they are well made in these parts, otherwise the riders will be in danger of being thrown too forward in the saddles, and the horses of falling with them. When placed in such situations, care is to be taken, that the fore legs of the horses stand even, so as to enable the examiner to judge properly of their shoulders, as the usual custom is, to have the near fore leg to stand before the farther one, and thereby render the shoulders to appear more backwards. Then, standing before them, the state of the breast parts are to be decided upon, which should be neither too wide nor too narrow, as the former causes them to be too distant in the knees, and the latter to be weak and diseased. After this, the state and condition of the legs are to be well looked to, in order to see that the horses stand straight, without knuckling; that the joints be firm, without trembling; and that the feet be even, and properly distant. In standing behind them while walked forward in the hand, it should be observed how they divide their legs, whether they be straight in the hams, and go in a sufficiently wide manner behind and close before. Remaining in the same situation, and causing

them to be trotted back, the observer will perceive whether they bend their knees properly, and go free from cutting or knocking the legs against one another, as well as whether the feet be sound, and the joints devoid of stiffness and injury from any cause.

When the qualities of horses have been so far considered, the examiner, by taking his station about midway in the space over which they are shown, may have a proper view, in every respect, of their figures and action; in which, the manner they carry their heads, the freedom which they have in their shoulders, whether they go safely above the ground, whether the haunches follow well, and no overreaching takes place, and whether they submit to the touch of the spur without drawing in their wind and enlarging in the bodies, whether they have any obstinate tricks, or blow in their noses, so as to become temperate, are to be particularly noticed.

In such trials every pace should be shewn, the walk being free, but the trot rather slow at first; and, when mounted, look that the horses pull fairly, but neither too high nor too low. In every pace, going lightly and well, is very material in considering the value of horses. Just at the door, before the horses return to the stables, their eyes should be again examined, to see that they are perfect and good in every respect.

The only way to know what can possibly be known of these animals, in a short time, is that of seeing them ridden and then riding them; therefore, when every necessary examination has been made, they should be mounted in snaffle bits, have their heads given them, and be walked well over stony rough roads, both up and down hill,—where, if they perform properly, with the bridles rather loose, there can be little doubt of them.

PURCHASING OF HORSES.

The usual custom of purchasing horses is either with the warranty of "sound, free from vice or blemish, and quiet to ride or draw;" or without warrant, "to be taken with all faults;" in which case there is no pretence for returning them, except they prove glandered, which exception arises from the illegality of selling any horses under such circumstances. The proofs of soundness or unsoundness depend on a variety of points and customs peculiar to the business of dealing in horses. The terms and conditions of purchasing horses should always be somewhat understood and settled before the examination and shewing takes place.

PRACTICES IN THE DISPOSAL OF HORSES.

In the disposal of young horses, there are different practices followed in different places; in some they are disposed of to jobbers, or taken to the neighbouring fairs and markets; but in others, among those of the more large northern horse breeders, the young horse stock is, at two or three years old, usually either sold to the farmers in their immediate vicinity, or to those in the more southern counties, who, after training, keeping, and working them for much the same length of time, dispose of them to the dealers in the metropolis and other large towns. This forms a regular sort of system, which is very general, and is extremely useful and convenient to the several parties who are engaged in it. The breeder and rearer meets a regular and ready market for his young horse stock at the period when he wants to part with it, which enables him to carry on his practice with more spirit, and without the danger of being overstocked; the farmers get their work done while the animals are in their growth, and affording them a good profit,—and they know where to dispose of them as circum-

Nicking, Docking, Casting and Cutting Apparatus and Implements.

Fig. 1.

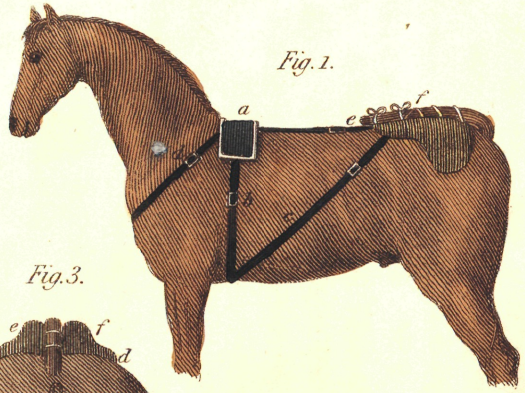


Fig. 9.

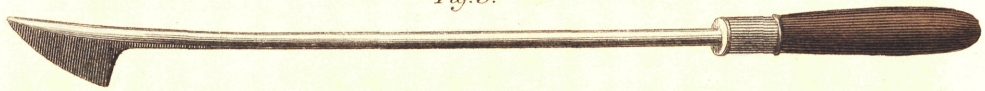


Fig. 5.

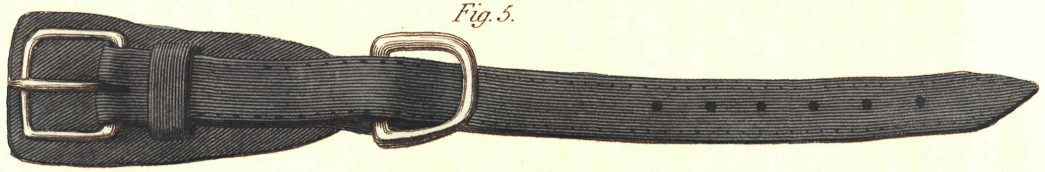


Fig. 3.



Fig. 2.

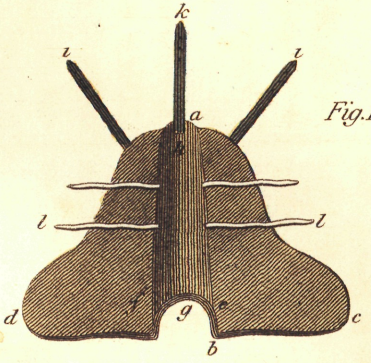


Fig. 10.

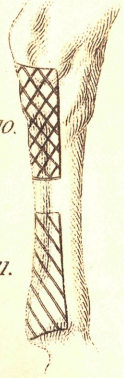


Fig. 11.

Fig. 12.

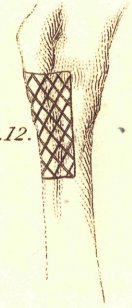


Fig. 8.

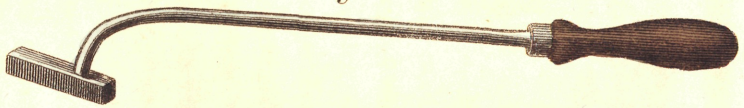


Fig. 7.

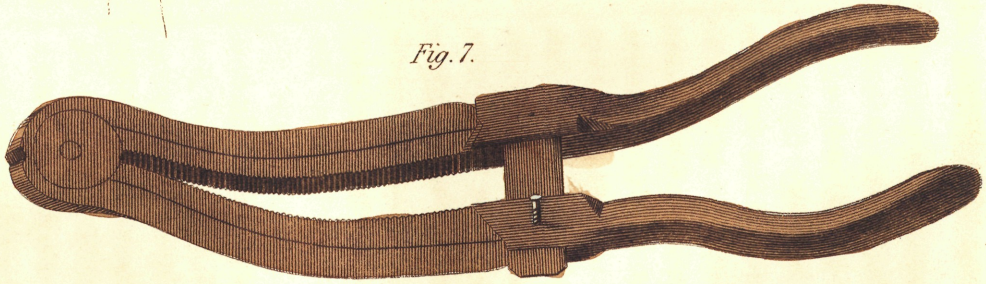


Fig. 6.

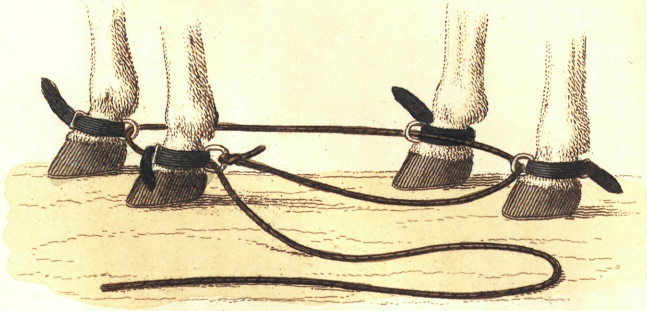
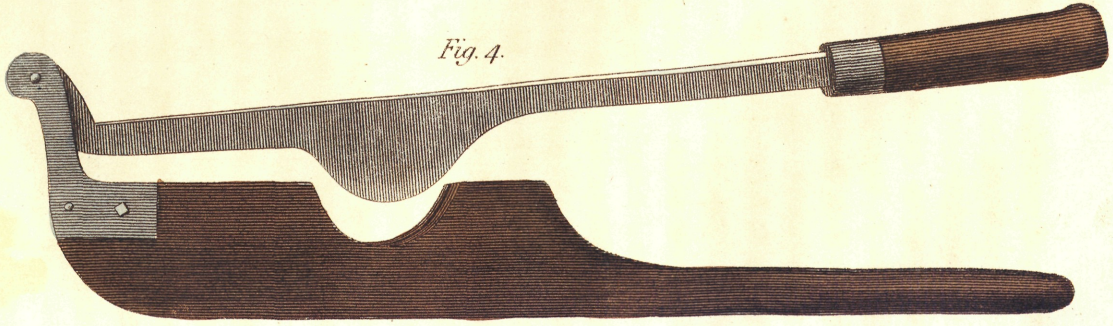


Fig. 4.



London Published by Thos. Kelly, 17 Paternoster Row, Jan.1 1823.

stances may suit, being aware that others will succeed them for further use; and thus, by this system the great dealer is well and conveniently supplied, almost without any trouble or expense in going after them. In the conducting of this business, besides the principals, there are generally other persons, who go between, and get their living by it, as jobbing middle men, who procure the horses from those who raise them, and dispose of them to the southern farmers; and the dealers near the large towns, who purchase them from those farmers, at their own risks, standing the whole chance of their sale to the buyers in such places; or else, they get them on commission for such horse-dealers. The horses are very commonly disposed of to the dealers in their full tails, being afterwards made up, so as to suit their different purposes, by having different operations performed on them; when, after being *made up*, as it is termed, by proper feeding with different soft nourishing matters for some months, they are then sold by such dealers to their different customers.

Section IX.—*Operations practised upon, and Diseases and Accidents incident to Horses.*

Before we proceed to consider the diseases to which horses are liable, and the various means which are necessary in removing them, it will be proper to describe the several operations which are usually performed upon them for securing, ornamenting, and rendering them more tame and tractable.

CASTING OR THROWING HORSES.

This is the means of placing and securing them in such a manner as to be capable of having different operations performed upon them with ease and perfect safety; and is to be effected by properly-formed strong straps, rings, and buckles, or *hobbles*, fastened firmly and tightly just above the hoofs on the legs, so that the feet may not slip through them: a strong flexible rope, of suitable length, which has been fixed to the rings of one or other of the straps on the fore legs by one end, must then, if to the near fore leg, have the contrary end passed first through the ring of the strap on the near hind leg; after that, through that of the off hind leg; then through that of the off fore leg, and conclude by passing through that of the near fore leg, which by being pulled by the strength of a few men, will so draw the legs of the animal together, as that it must fall or be cast, in which it is to be regulated and assisted by one person holding the head, and another pushing on the near side, when in the act of falling. In all cases, it is proper to have all the legs of the horse brought as near together as possible under him before he is cast; and those who pull the rope should not lose the necessary power of doing it readily and easily by standing at too great a distance. The throwing or casting of horses should always be done in places where there is a sufficiency of straw or other littery matter for them to fall upon in a safe manner. Most other contrivances, which are occasionally made use of in performing different operations on the horse, are less safe and useful than the above. The *hobbles* are seen in the *plate*.

CROPPING THE EARS OF HORSES.

This is an operation or practice which is properly growing every day less fashionable, and is consequently less attended to in the keeping of horses. It is very simple in its nature, being performed merely by a contrivance of the *clam* kind, but which is longer and rather larger, and more curved than that used for some other purposes. The branches of it are made to receive the ear between them, and

which are so contrived as to give any sort of crop that may be thought necessary. When that point has been determined on, they are firmly closed and fastened so that the ear cannot move or slip out, when, by a large sharp knife, the part of the ear which is deemed unnecessary is, at one sweep, to be removed. The clams are then wholly taken away, and nothing further is necessary. As it is proper, in the view of ornament, that both ears should be the same, the portion which is cut from the first is applied as a direction for cutting the second ear. There is no necessity, after the cutting, for any sort of cleaning or dressing in the divided parts, as they readily heal and become sound of themselves; but much care is required in putting on the bridle, as there is for some time a shyness in the animal in having his head handled, which may otherwise grow into a bad habit. Whenever cropping is practised, the ears should be cut well down on the fore parts towards the head, as when left large and bunchy at the bottoms, and made short and narrow at the tops, they have a clumsy unpleasant appearance. The operation is sometimes easily performed, by placing two partially split sticks suitably upon each ear, and then cutting off the parts intended close to them, simply by means of some sharp tool. The hairs in the ears of horses should never be clipped, pulled, or burnt away, as is often the custom, as they serve different useful purposes, in respect to sound, insects, and light matters that float in the air.

NICKING THE TAILS OF HORSES.

This severe process or practice is now held in much less estimation than formerly, though, in some cases, it greatly improves the appearances of the horses. In securing the animals before performing this operation, they are either put in the *break*, fastened in the hind legs by leathern strappings, or thrown down; by the two first, they stand without being able to kick out behind, or lie down, while in the last they rest wholly on the ground.

Three cuts or incisions are then to be made across in the under part of the tails, in such a manner as perfectly to divide the muscles that draw down these parts; which, in the first, may be about two and a half inches from the beginning of the tail parts, carrying it quite over from where the hair terminates on one side to the other. The next cut is to be made in exactly the same manner, rather more than two inches from the former; and the last, in the same way, and at the same distance. As soon as the middle cut has been performed, a portion of the muscle, on each side the first, will present itself, in case both of them have been executed to a sufficient depth; which rising part may be drawn up and cut away; and the same be done at the middle nick, when the last cut has been made. The work being thus finished, the next step is, to put a large firm substance of tow, in the pledget form, upon the first nick, tying it down with a linen roller, fastened on the upper side, for the convenience of being more readily removed as there may be occasion; which, when there is much discharge of blood, should be somewhat tightly done, in order to restrain it. The other nickings are to be proceeded with in the same way; but no sort of dressing of any kind, except the tow pledget, is necessary or proper to be used, though often advised and employed.

Immediately after this has been done, the pully is to be made use of, with not too much weight at first, but just what is sufficient for keeping the tails properly up; and it is essentially necessary, in most cases, that the bindings on the cut parts be let loose the next

morning, so that there may be no sort of pressure on the upper parts of the tails; but they are not, on any account, to be forced away, but the loose ends only are to be cut off and removed. In a few days matter will form on the surface of the wounds, detach and render the dressings capable of being removed with facility. The openings will then appear large and gaping, for the filling up of which various applications have been advised; but, probably, the best practice is, to leave them to themselves, only letting them be always open to the free action of the atmosphere. The resources of nature in this way are very great, and much mischief is often done by the absurd and unnecessary applications and nostrums of ignorance.

About three days after the nickings have been performed, the weights used in raising the tails may be suitably increased, the lines upon which the pulleys run being moved more towards the heads of the horses, in order that the points of their tail parts may have rather more inclination towards their backs; but they should not be taken out of the pulleys for eight, ten, or more, days, when the hair on them may be let loose and be combed out, washing it simply with soft water a little warm, which will be quite sufficient for the purpose, after which the horse should be properly exercised. The animals should not continue less time in the pulleys than about three weeks; but after the first eight or ten days, they may be duly exercised every day, but without putting the hair of the tails every time in order, as that will only be required every five or six days.

Some persons consider the different nicks or cuts as best made in the parts between the articulating joints of the tails, and not too deep in the middle parts of them; and that the fleshy muscular parts should not be removed, as they form a sort of support, when left on, for the carrying the tails higher. The tails are best put into the pulleys at the time of nicking, on account of the less soreness, with slight weights, gradually increasing them afterwards as they increase in strength.

Cold is to be well guarded against in the stable, and the bodies of the horses should be kept well open, and supplied with warm water as drink, during the operation and healing of the parts. The manner of nicking and suspending is seen at the proper figures in the *plate*.

DOCKING THE TAILS OF HORSES.

This is a painful but speedy operation, which mostly leaves the horses ready for any use for which they may be wanted, without loss of time. In performing it, as soon as the length of tail which is to be left, has been decided upon, the hair that grows upon that extent of it is to be tied and fastened back; the space of about an inch farther in length is then to be cleared, for the purpose of conveniently fixing the docking tool, which is a half circular sort of sharp cutting shears that grasps the tail, having long lever handles that give the power of lopping it off at once. As soon as the operation has been performed, the bleeding cut end or surface is to be carefully seared or cauterized with a very hot iron, so as to stop the flow of blood. This operation should be cautiously performed, so as not to cause mischief, which has sometimes arisen from its having been executed with too much severity. It has been usual with some to apply resinous dressings afterwards, but as the destroyed parts regularly slough off of themselves, no sort of dressing whatever is necessary.

It is very doubtful whether there be any advantage by leaving the under parts longest in the operation; as well as whether the bleeding can be so properly restrained by any other applications, as that of the hot iron.

CUTTING, GELDING, CASTRATING, OR REMOVING THE MALE PARTS OF HORSES.

In this operation, the horses being well secured and the parts placed suitably, either by putting and fastening them down on their left sides, and having the legs on the same drawn up towards the necks by proper means, or by casting them on their backs with their legs upwards, so as to have them well drawn forward and secured in that situation, so as to render the parts readily come at, the work, is to be begun by taking fast hold of the scrotum and testicles with the left hand at the inferior part, so as to give them a full, prominent, and forward direction: in which posture they are to be held with firmness and steadiness, so as to stretch the skin and render the cutting less difficult. The skin is then simply to be cut through over each testicle, to the length of from three to four inches, not being so deep as to wound them. Keeping the same firm hold, the cutting is to be gradually carried a little farther, until such time as a little portion of fluid is seen, which denotes that the last coat which encloses the testicles has been laid open, which is to be done to the same extent. This part of the operation renders the appearance of the testes evident, which are then to be slowly and cautiously brought forward, and the cords of them secured by the contrivance termed *clams* fastening upon them ; and they being so securely held by it, that when the testicles are cut away, they may not slip back, and produce danger by the great discharge of blood that takes place. These parts are then cut away, one after the other, so as to leave about the fourth part of an inch for being secured by the hot iron, which should be only moderately heated, and without any application of the resin or other kind, as is too frequently the case. The horses are then suffered to rise, and though there may sometimes be considerable bleeding, it will seldom be attended with any bad consequences, or require any other means of stopping it, than that of putting the horses in a cool place. For the form of the *clams* see the *plate*.

Before the operation is performed, in the case of the older sorts of strong well-fed horses, it may occasionally be useful to bleed, and to use opening means, but in other cases they are unnecessary. In dressing the parts after it, there will rarely be any thing else required, as they readily heal in a better and less troublesome manner when left to themselves.

In this operation, and the manner of executing it, which is noticed below, the chief circumstance which is necessary to be well regarded is, the prevention or removal of the degree of tension and swelling which is mostly liable to take place in two or three days after they have been performed, which is to be effected by lessening the inflammatory state of the parts.

TYING OR TWITCHING.

The method of effecting the business of castration, by means of the ligature, has long been known, and is still practised, in many places, with much success, on horses of all ages.

It is thought, by some persons, to be more convenient, and less painful and dangerous. than the other manner. In this ligature or twitching practice, a very strong, small, thread-like cord, which has been well prepared by proper waxing and greasing, is to be passed round the narrow bottom part of the scrotum, just above where the spermatic vessels of the testicles enter the body, and then drawn very tight, in a peculiar sort of holding-knot, by the strength of a strong man ; care being taken in fixing it, that no part of either the substances of the testes or belly be included. By this means, all circulation being prevented between

the bag and testicles, and the internal parts, the whole of the scrotal bag, with its contents, becomes lifeless, decays, and in a short time drops off without further trouble.

When the business has been finished, in either of these ways, if the horses are in the house, they should be kept loose and cool, being chiefly supported by good hay or cut grass, and mashes, for some days, after which gentle exercise and a little corn may be given: but if they have been taken from the pastures, they may be again directly turned into them. The best seasons for performing such operations are, those when the weather is neither too hot or cold. The latter method is capable of being executed by almost any person with but little trouble or expense, and when done in the young foal state, it is not productive of the least injury to their growth or disposition.

OPERATION OF BLISTERING.

When this operation is necessary, considerable attention is requisite for the proper performance of it. In the first place, the part which is to have the blistering matter put upon it should have the hair shaved away as clearly as it can be; and then be well washed with soft soap and water, which causes the blister to take more ready effect. As soon as the part becomes fully dry, some strong blistering ointment may be rubbed over it for a short time, and, when necessary, a thin stratum of the same be laid over the whole. Care must be taken to secure the head of the horse, so as to prevent the materials from being forced off, which is in the first instance done by the shortening of the halter; but after the first day, by means of a sort of wooden cradle put round the neck of the animal, and so contrived for the purpose as to protect them from being forced off by the nose of the animal, by turning the head.

When the operation is finished, and much action has been produced, the parts should be well softened with a little warm milk and water, and be occasionally washed over with a softening discutient lotion of the saturnine, or other such kind. In the common operation of blistering, nothing more will be necessary, than simply to grease the parts a short time afterwards, and when a sufficient degree of softness has been produced, to wash them with the saponaceous mixture as above. The operation of one blister should always be well over, before another is in any case applied to the same part.

FIRING, OR THE APPLICATION OF THE ACTUAL CAUTERY IN CERTAIN CASES OF DISEASE IN THE LEGS OF HORSES.

In the managing of this operation, several points and circumstances are material to be well regarded and attended to, such as the proper preparation of the parts, the rightly securing of the animals, and the properly drawing the lines with the hot iron.

In order to execute this business with exactness, the hair, in all cases, should be well cleared from the parts, by shaving or other means; as, unless this be carefully done, much inconvenience will arise in different ways. The horses should, in most cases, be cast, and fastened in that state, as the operation can seldom be well done in a standing position.

In securing the horses, where the firing is to be done in the fore leg of either side, a proper length of strong girth webbing should be put, with one end round one of the fore legs, just above the knee, and the other end well fastened round the hind leg above the hock, in order to keep the fore leg from being thrown out of the straight line; as on the original fastening being withdrawn, the diseased leg

may be brought out to such a distance, as the web will permit, and be held there by means of a strong cord fastened to the part of the foot above the heels of the shoe, thereby preserving the leg steady at the time of using the hot iron, being always, however, prepared for the consequences of the strugglings of the horse, which are not unfrequently very severe and strong.

In firing the inside of the hock, if on the near leg, the horse should be secured on that side, and should have the hind legs secured by similar means, as those already noticed, and then brought up towards the neck, something in the nature of a collar, made for the purpose, being put round it; so that the part to be operated upon may be properly exposed and conveniently come at by the operator, who, as well as his assistants, should be on the guard against the struggles of the horse, as it has much power to do mischief.

In firing for the curb, the same posture of the horse may also be used, but here it is equally requisite, that the operation be performed on the outside as well as the in. In firing both legs, it can be of but little difference on which side the horse is first put, as he may be readily removed to the other. In having the operation executed on the inside stifle, the under leg, or that to be performed on, should be drawn forward to the necessary extent, the upper leg being kept well back by suitable means. The inside may be done without any sort of inconvenience. And in firing for the ring-bone, the horse may probably be the best secured somewhat in the first-mentioned manner, the legs being thereby readily drawn up, and the pasterns properly exposed.

Whenever the hot iron is to be applied, considerable nicety and attention are necessary in its management. The movements of it on the parts have, in general, some particular direction given them. Some prefer doing it in different slanting lines, others in upright ones, all round the parts; but there is probably no material difference, provided that they be carefully done, in any of the ways. As the true skin should but in a very few cases ever be acted upon or injured by the hot iron, it should be always carefully kept well rounded and smoothed on the side which is applied, as it is liable to become thin and jagged from so much heating, by being rubbed well with a proper stone, or some other substance. The process may be considered to have gone far enough, when the part puts on a duskiness of appearance, in consequence of the outward thin skin being destroyed. It is generally the best and safest practice, not to carry the process too far.

DISEASES OF HORSES.

The diseases are too numerous and too various in their nature in these animals to be properly or sufficiently considered and investigated in a work of this nature; but the causes, appearances, and best means of the removal of many of them are noticed and explained, as far as the limits of this portion of it will allow. The reader, however, should, on many of these subjects, consult the "Complete Farrier," referred to in a former page, and other such works.

EFFECTS OF COLD, OR COMMON FEVER.

All horses which are exposed to much severe cold, wet, or damps, immediately after using great exertion, so as to be cooled suddenly, are very subject to complaints of this sort; as well as when they have been so cooled, and then put into too warm situations. But young horses, when first brought up into warm houses from the pastures, are more especially disposed to such attacks.

These diseases are sometimes so mild and yielding in their nature, as to require little trouble or attention, readily giving way to good dressing, and a few warm mashes, with proper rest; while at other times they attack and go on with such severity and expedition, as to demand the use of proper remedies to restrain and remove them on their first appearance. The marks of this state of disease are these:—great restlessness, rejection of food, with cough, apparent soreness about the top of the throat; the breathing and pulsation in the vessels more quick than usual, with heat, thirst, and distention of the nostrils; great coldness in the extremities, with a roughness and staring in the coat; and sometimes much constipation with high-coloured urine.

In removing these complaints, where they run high, blood must, in the first place, be taken, in proportion to the size and strength of the animals, and as there may be a necessity; after which the bowels are to be well opened, and then the following powder may be given generally with good effect in such cases:

Take of—Antimonial powder, two scruples and a half,
Submuriate of mercury, or calomel, half a drachm,
Nitrate of potass, or common nitre, in powder, ten drachms,
Root of liquorice, in powder, two ounces and a half; mix and make them into a powder which may be given in a large hornful or two of oatmeal gruel a little warm, as there may seem to be occasion.

The bowels may be well opened and kept in that state by the use of either castor oil, in the quantity of three or four ounces, a rather strong solution of the sulphate of soda or glauber salts in boiling water; or, where the large bowels are much loaded, by a clyster of the simple kind, as directed below:

Take of—Common salt, one ounce and a half; dissolve it in
Infusion of senna, a pint and a half,
Common olive oil, four ounces,
Oatmeal gruel, made thin, two pints and a half; mix them well, and then throw the liquid up by a large pipe and bladder, or syringe proper for the purpose, as often as necessary.

After the operation of which, and the powder of it is fully over, the constriction and obstructed state of the small vessels on the surface may be relieved and restored by the ball as below:

Take of—Antimonial powder, half a drachm,
Camphor, rubbed into fine powder, one drachm,
Root of contrajerva, in powder, an ounce and a half,
Treacle, as much as is necessary to make them into a ball; which is to be broken and given in a hornful of thin gruel, and repeated as there may be occasion, at proper intervals of time, warm drinks and mashes, where they can be taken, being plentifully supplied, and the animals being kept not too close, or too much confined for room in the houses.

Their strength is constantly to be preserved as much as possible; and where the mashes are rejected, by such other suitable means as they will take. And where there is a restricted dry cough, which is not unusual in such cases, the confined steam of mashes may be beneficial, and the use of a decoction of the following kind, either with or without the ball:

Take of—Sliced liquorice-root, two ounces,
Bruised linseed, three ounces; boil them in
Water, five pints, for a little while, then strain off the liquor, and add,
Tincture of opium, two drachms and a half,
Sugar-candy, dissolved, one ounce; mix and make them into a decoction; which may be given in the quantity of about a pint and a half, once or twice in the day.

When the febrile states of the animals have been taken away, there will seldom be any thing further necessary, except a little gentle exercise or work daily, and very good restorative keep, where they are left in a greatly weakened condition.

In the milder cases of this sort of colds, strong treacle possets, when given while just warm, and freely exercising and rubbing the horses directly afterwards, have been found sometimes speedily to remove them; but much circumspection is necessary, to preserve them

dry in every respect, and sufficiently warm in the houses, as soon as the first effects are over, giving them repeatedly warm drink in a small quantity at a time, with a little meal in it each time, and hot mashes, so as to have the benefit of the steam that rises from them.

CATARRHAL FEVER OR DISTEMPER.

This is a disease of horses that in general arises from too much exposure to cold, or an improper state of the air, and which often affects them in the beginning of the spring season. It may probably be caused by severely sharp easterly winds, which are prevalent at such seasons, and the effects of which, in consequence of the changing its coat, the horse may be less able to withstand.

It chiefly attacks such horses as are kept shut up in close stables; but not unfrequently seizes others of different kinds. It is often attended with inflammation and soreness in the throat, which cause difficulty of swallowing, and much affects the breathing in many cases.

In the first attack of the disorder, there is generally more or less of fever, which will require proper bleeding, in proportion to the state in which it may be. If the throat be also affected in the glands about the ears, it will be proper, in the first case, to have recourse to blistering the throat, and in the latter, some proper discutient application of the camphor kind may be freely used; or, in case of a much inflamed state being present, a bran poultice may be preferable. The bowels are to be well kept open, by means of proper clysters, or where there is much costiveness, a purge of the less violent kind may be given, such as that below:

Take of—Socotrine aloes, in fine powder, half an ounce,
Submuriate of mercury one drachm,
Hard soap, sliced, six drachms,
Sulphuretted oil, as much as is sufficient to make them into a ball, to be given immediately.

In case of much oppression in breathing, a blister may be applied to the sides of the chest, and a seton be inserted in the front of the breast part; but it will always be improper to give any sort of stimulant cordial remedies, as is too much the case, in such complaints. Sudorifics, as below, are to be freely given for some days:

Take of—Camphor, rubbed with spirit, one drachm and a half,
Antimonial powder, one drachm,
Subcarbonate of potass, half an ounce,
Asafœtida gum resin, three drachms,
Sulphuretted oil, as much as is necessary to make them into a ball, which may be given once a day, for three or four days in continuance.

Mashes should be freely given, with the use of green food, and water which is just a little warm. The horse should be kept rather warm, and not be too much hurried with exercise.

In these cases, the disease may often be caused by some peculiar state of the air, which sometimes affects various horses at the same time, without any thing of the infectious kind being present.

Mucilaginous drinks of all kinds should be fully indulged in, until a running at the nose is produced, when the horses should have plenty of water, with free air and exercise.

STRANGLES.

This is a disease to which most horses of the younger kinds are subject once in their lives, though it may attack the older sorts in some cases.

It would seem to have its origin in a certain kind of infection, which is transmitted by the air of the atmosphere, and increased by the warmth and closeness of the stables or other places in which the horses are confined.

The appearances which mark the presence of the complaint are, a feverishness, with cough, and difficulty of swallowing, in consequence of a swelling about the higher parts of the jaws near the throat, but sometimes lower down under the muscles of the tongue; which is attended with great heat, pain, and inflammatory action, so as frequently to form large swellings, which almost prevent any thing being eaten until they disperse or suppurate. They are not, however, in all cases, accompanied by fever, though it is common in most of them. Young horses have it often while at grass, and not always very favourably; but if they escape it there, they generally have it when first taken up from the pastures.

When there is not much inflammatory action, and the collected matter is not deep, there is seldom much danger, but when the contrary is the case, more is to be feared.

In removing the disease, where the fever and glandular inflammation are high, blood should first be taken, to the amount of three or more pints, from the neck veins, as near the throat as possible, and repeated if there be occasion, the bowels, at the same time, being kept open by mild laxatives, such as castor oil, and clysters of the common kind. The powder as below may then be usefully given, keeping the heads and necks of the horses rather warm by suitable means.

Take of—Camphor, rubbed into fine powder, one drachm and a half,

Nitrate of potass, or common nitre, ten drachms,

Root of ginger, in powder, half an ounce; mix them and make a powder; to be given in a hornful of warm gruel as there may be occasion.

Where the swellings have a disposition to suppurate, they should be encouraged by the frequent applications of bran or linseed meal poultices; but when they incline to disperse, they should be often wetted with camphorated goulard water, so as to forward that termination and result: and when matter is found to be present in the tumors, in the proper state, it should be let out with a lancet, in the most depending parts, so as to prevent ulceration; the openings in all cases being made properly large, so as to discharge their contents freely, the whole being well pressed out, dressed, and kept clean about the orifices. In case the breaking of such tumors takes place in the internal parts, the mouths and noses should be well washed and cleaned out several times in the day by a sponge with vinegar and water; and the steam of scalded substances of the bran kind, with camphor and vinegar, be often used for the relief of the breathing, as well as for the correction of the disagreeable smell that is produced.

These diseases, where they chiefly consist of discharges from the noses of the animals, are mostly of longer duration than in other cases, and sometimes terminate unfavourably, by bringing on affections of the lungs.

The keep of horses in these states should be, for the most part, of the soft mash and meal gruel kinds; and the drink, water a little warm, or thin gruels to keep up the support of the animals more effectually, as there is commonly much weakness taking place. It has been recommended, that when the disease seems to be severe, the horses should be kept in very close warm stables or houses, and have warm water, mashes, and other such matters, plentifully given them; and that no sort of cold substances should on any account be given them; and that their heads be not kept too much down, as where these points are not well attended to, much injury may ensue.

When the coughs, troublesome breathings, and offensive discharges from the noses of the horses, still continue, and there is rather a

decline than improvement in their strength, a drink as directed below may often be of much service:

Take of—Oak bark, in coarse powder, two ounces,
Liquorice root, sliced, one ounce and a half,
Caraway seeds, one ounce; boil them in
Water, five pints, to four; then strain off the liquid, and add of
Tincture of opium, half an ounce,
Sugar-candy, dissolved, one ounce and a half; mix and make them into a drink, which may be given in the quantity of from half a pint to a pint, two or three times a day.

When all appearances of the complaint are removed, recourse may be had to strengthening remedies of the bark and other kinds, with good keeping, in order fully to restore the animals; but, in most cases, the latter will alone be sufficient. Some persons think, that on the close of the disorder a purge may occasionally be given with benefit, but it is probable that such means will be seldom wanted.

The horses should, in all cases, be well cleaned, fed, and dressed; and should have, at first, but light exercise or work.

VIVES.

When the parotid glands are affected with inflammation and swelling quite up to the root of the ear, this state of the disease takes place; but which is not rapid in the termination of the tumors, as they sometimes continue for several weeks, extending downwards below the throat, so as to end in the above disease.

This, like the complaint just noticed, most commonly attacks young horses, and arises from similar causes, as those of catching cold, being over-heated, or over-worked, about the period of shedding the teeth; yet it not unfrequently seizes those in the more advanced stages of their life, though they may have had the above disorder

In this disease, the appearances are, that the horses cough more than in the above case, have not less difficulty in swallowing from the soreness of the enlarged glands, they being occasionally so tender, that neither any sort of pressing on the part, or bending of the neck parts, can be suffered, without much pain and uneasiness being produced. The inflammatory state extends sometimes even to the eyes, which are often partly shut up, and send forth a thin aqueous discharge. In general, there is a greater or less degree of fever present, which frequently takes away the strength of the animals very fast, and, with the want of their usual quantity of food, in consequence of the swellings, reduces them speedily and greatly. The complaint is also aggravated, sometimes, by the pain, inflammation, and swelling of the gums and upper parts of the mouth.

The removal of these complaints is easy or difficult, according to the causes from which they proceed, as when they arise from cold they mostly give way readily, but when from other diseases, as farcy or glanders, they are rarely cured until these have been completely taken away. In simple cases of this sort, it is usual first to rub the parts with some softening discutient ointment, and then to cover the whole head and neck parts with warm coverings. At the same time, blood may be taken in proportion to the strength of the horses and the violence of the fever, repeating the bleeding as there may be occasion: and if there be inflammation and swellings of the glands, they must be either driven back by discutients, or be brought forwards by warm applications of the poultice or other kinds. When the matter is formed under the jaw, it may be readily let out by the lancet, when in the right state.

The first appearance of swellings of this nature may sometines be speedily removed by

the use of active purgative means, and the application of strong discutient washes, such as below:

Take of—Muriate of ammonia, or sal ammoniac, six drachms, dissolve it in

Acetous acid, or vinegar, ten ounces,

Solution of subacetate of lead, or extract of lead, one drachm and a half,

Spirit of camphor, or camphorated spirit, one ounce and a half; mix them, and form a wash, which is to be frequently used to the swelled parts.

Internally the same means may be employed as in the two preceding disorders, an opening and moistening sort of food being made use of until the usual keep can be taken by the animals. A full daily use of meal gruels, with hot mashes, in one of which a small quantity of nitrate of potass has been dissolved, will be of great benefit.

The purging of horses recovering from this, as well as the preceding disease, is, probably, equally unnecessary, and in some cases may be greatly hurtful, though they are often advised.

GLANDERS.

This is a disorder which has been much considered in many different points of view, but our knowledge of which remains still very imperfect. Much nice discernment and discrimination is, of course, always required, in deciding upon it, in order to prevent the unnecessary destruction of useful horses, as there are many appearances in severe colds that have a strong resemblance to it. Consequently, it will be proper, where the nature of the complaint is not fully known, to keep the animals to themselves, without any sort of connexion with others, in any way whatever, until it be perfectly ascertained.

All kinds of horses are equally liable to be attacked by this dreadful malady, which, in its true state, is marked by these appearances in its different stages. In the early state of the disorder, there is mostly a running of a sort of glary white mucous from only one side of the nose. And on looking into the nostrils, it will be seen, that the unaffected one, from which there is no oozing, is of the pale flesh-colour; while the other is constantly of a much higher colour, and that in proportion to the extent of the inflammation with which it is affected. At this period there is usually one or more ulcerations to be discovered up in the hollow of the nose, and on one side, under or near to the lower jaw, or about the glands of these parts, there will be found a hard indurated swelling on the same side as the affected nostril. In colds there are, however, invariably discharges from both nostrils, and their different parts affected; and as it may sometimes happen that in glanders both nostrils may be so circumstanced, the main difference will be, in such cases, that the general state of the constitutions of the horses in the former, will display a dullness, difficulty of breathing, or an increased action of the vessels performing the circulation of the blood; while, in the latter, the discharges may last a long time before their general states of health will be at all affected.

As the disorder advances, it puts on a still more formidable aspect; there is a very fetid smell, and an unhealthiness in the appearance of the matter that is discharged takes place, the latter often changing from yellow to a greenish cast, with streaks of the bloody or red kind intermixed. Its progress is very uncertain, as it sometimes remains a long time without much other evident inconvenience than a trifling discharge and swelling of the glandular parts, which not unfrequently disappear for a length of time, in consequence of some alteration in the animals, happening either in the nature of their keep or otherwise,

but which invariably return again, often in a very increased manner. In the more rapid cases, however, the cartilages, and even the bones, of the nose are sometimes quickly corroded by the acrid virus, producing ulceration and absorption, which last finally does much mischief to the whole body, and particularly the lungs; but which is capable of being hastened or retarded by certain causes, as the nature of the keep, air, and exercise; and many horses continue to work, in some situations, for several years, seemingly without the disorder being increased. But the keeping of glandered horses is always improper, and should be wholly prevented.

In the more early stages of the disease, the animals rarely suffer much in any way, neither their appetites nor conditions being materially affected; when, however, it has become more advanced and inveterate, they are both deranged, and the whole system becomes weakened, emaciated, and disordered.

This being the nature of the complaint, when, in any case, a horse is suspected of having it, the animal should be instantly taken away from the others, and kept entirely by itself. Then every utensil and part of the stable, or place with which it has been connected, should be well cleaned, and effectually freed from all filthy matters by scraping and scouring their fouled surfaces, and then washing them with soap and boiling water, with which scouring-sand should be fully used; after which hot lime-water should be freely applied over the whole, and fresh air plentifully admitted; when they may be safely used again. Neither fumigations, nor any other means, except of this kind, can ever be effectual, however much they may have been recommended.

In attempting the removal of this disorder, sulphur, and other remedies of different kinds, have been tried, as also has the exciting of discharges by caustic mercurial substances, and the introduction of mercury into the system, but without any decisive advantage; therefore, other modes of treatment must be looked to when the disease is ascertained. But, where the circumstances of the cases are doubtful, the means which have been directed for the effects of cold and the strangles, may be properly employed, together with good stabling management.

During the continuance of the disease, the horses keep constantly wasting in their substance, notwithstanding they eat their food, and work a little, so that its termination is always fatal.

INFLAMMATION OF THE LUNGS.

This is a disease in horses which generally proceeds from sudden changes in the moisture, heat or cold, of the atmosphere, which act partly on their general system, and partly on their surface parts, in consequence of being exposed to currents of air, when over-heated; to too much wetness, or too severe cold; and sometimes it arises from too long-continued or too great exertion. It is commonly very rapid in its attacks, and the vascular confined state of the organ renders it very distressing, in consequence of the swelling that always takes place, and which is, probably, the cause of the oppression of breathing that attends it.

It is denoted by the shivering which precedes and accompanies it; by a dullness and drooping of the head in the animal; and by the ears and legs being very cold, with a smallness and freeness from swelling in the latter. In proportion as the disorder increases the breathing gets more difficult, as is seen by the more shortened and quickened motions of the

nanks. There is a feel of hotness in the mouth of the animal, which, when it endeavours to cough, is prevented by the soreness of the affected parts. It rejects all sorts of food, and but rarely lies down. Under these circumstances, if not speedily relieved, the disease proceeds with such rapidity as to terminate in mortification in a very few hours, or to form a collection of matter, which, though less quick in its consequences, is not less fatal in its nature.

In the cure of the disease, the attention must be directed to different circumstances. In the first place, instantly on the attack the fever and local inflammation must be reduced by proper bleeding, in proportion to the state of the animal, and the nature of the affection. The bowels should be well opened by a common clyster, such as is directed above, repeating it until the proper effect is produced. Or a moderate purge may answer the same purpose, if preferred.

When these means have been properly employed, the following ball may be given:

Take of—Tartarized antimony, or emetic tartar, two scruples and a half,
Camphor, rubbed fine, one drachm and a half,
Asafœtida gum-resin, one drachm and a half,
Liquorice root, in powder, one ounce,
Sulphurated oil, as much as is necessary to make them into a ball, which may be repeated as there may be occasion. In some cases, the antimonial powder may, probably, be better, as determining to and acting more on the surface.

Soon afterwards the horse should have a small bran mash, and some water as drink, given while they are just warm.

At this time, where the attack of the disease is very severe, the inflammatory action in the parts may also be greatly relieved by strong blistering substances being applied to the sides of the chest, or a seton superficially introduced in some part of the chest and the breast, so as not to cause them to inflame too much.

The horses should be a little clothed in cold seasons, and a free circulation of air constantly kept up in the houses or stables where they are kept. There should be nothing put anyways tight round the bodies of the animals, on account of the soreness of the chest, and that the motion of the ribs may be left more free and easy. The old practice of loading the horses with clothes, and the over-careful exclusion of free air, are always to be avoided. The more modern method of too free and great exposure may likewise be, in some measure, improper; but a moderate degree of coolness seems constantly to be proper and useful in lessening the feverish heat and overaction of the vessels in this as well as other states of inflammation.

Where the inflammatory state of the disease has not at first been taken away by proper bleeding, and where the disorder has continued for some time, there is often a disposition taking place to gain relief by an increased secretion and discharge of a sort of mucus from the lungs themselves by the nostrils. In which state, when there is no fever present, it will only be necessary to use such means as will promote and continue the discharge, as, if checked too suddenly, new inflammation might recur and prove fatal in its effects. In the time of such discharges, there is usually a swelling of the legs and of that part of the body under the chest, which takes place in consequence of the debility produced by the first active attack of the disease, augmented by the incapability of lying down from the pain and soreness in the chest.

In this condition of the animal, much nice attention will be wanted so to manage, as that the action in the system may be such as that

due absorption will be promoted and local dropsy in the part prevented; while the stimulus should not be such as to excite fresh fever. This will probably be best effected by the rather free use of the most nourishing matters as food, with frequent treacle mashes of the better kinds; and may also be assisted by the following form of medicine:

Take of—Acetate of potass, in powder, half an ounce,
Copaiba, two drachms,
Gum ammoniacum, in powder, two drachms and a half,
Root of liquorice, in powder, one ounce,
Venice turpentine, three drachms; mix them and make a ball; which is to be given as often as there may be a necessity.

The horses in this state should be always kept well dressed and cleaned, their nostrils being often carefully sponged out with warm vinegar and water; and the places from which they eat should be well freed from the slimy matters which may drop upon them from their noses, which often become, if suffered to remain, extremely offensive. The legs also should be frequently well rubbed, and kept warm by suitable means. As the horses get strong they may have the exercise of being walked out a little every day, gradually increasing it, but not to such a degree as to produce any sort of fatigue; neither should they be too much exposed to cold air. The bowels ought constantly to be preserved in a properly open state.

INFLAMMATION OF THE PLEURA OR LINING OF THE CHEST

In this disease there is much resemblance to the preceding in the nature of its appearances, and in its causes, but the animals are probably at first rather more uneasy and disordered.

It is marked by very great restlessness, as seen by the shifting and moving about from one place to another. The fever, from being moderate on the first attack, increases suddenly to a very great height. In the onset, the horse often attempts to lie down, but instantly rises up again, continually turning the head towards the side which is affected, something similarly to what takes place in bowel complaints, but without rolling on the ground, or shewing any of the other marks of such disorders. The ears and the feet are constantly exceedingly hot; the mouth dry and parched; the fever sometimes even continuing to increase to the last; and though there is an inclination to lie down frequently at first, the animal afterwards hangs back as far as possible in the stall, without any disposition of the same kind; pants in a short manner, and is disposed to cough, in order to be relieved, and sometimes it drops down dead. The working in the flanks and the restlessness, are greater in this than in the preceding disease, and the belly, in general, appears tucked up.

The means of removing the disease are much the same as in the above complaint. Full and instant bleeding, with frequent speedy repetitions of it, are often essential in both, but in this especially. The bowels should then be well emptied by mild purges, or strong clysters of the common kind; after which, the following drink may be given, and repeated as there may be necessity:

Take of—Spermaceti, one ounce; to be rubbed well with
Yolk of egg, as much as is necessary,
Nitrate of potass, or nitre, six drachms.
Antimonial powder, two scruples and a half,
Infusion of linseed, one pint and a half,
Treacle, two ounces; make them into a drink, to be used as above.

Blistering applications and setons may also be used as in the preceding case. And as local affections of the lungs are liable to come on

after this disease, much care is necessary in feeding and exercising the horses on their recovering, by having their food very light and opening at first, such as warm bran mashes, or those of well-soaked malt and barley, giving the water poured off from them as drink, gradually restoring them to their natural diet. The exercise, too, should be gradual, and constantly in the free air in fine weather, being increased with the strength of the animals; which treatment will much conduce to the removal of any cough that may still continue.

Some persons advise purging after this disorder, but which is probably quite unnecessary.

INFLAMMATION OF THE STOMACH AND BOWELS.

Inflammation takes place in these parts from different causes, though they are not particularly disposed to it. It is produced by the sudden action of heat after great cold, by taking too much cold water in the over-heated state of the body, by particular articles of food, great constipation of the bowels, too strong and violent purgatives, and by local injuries of the parts, as well as some other causes.

In these states, there is great uneasiness with fever; much pain and thirst, with rather hard and small pulse; the belly is often stricken by the hind feet; the horses sometimes suddenly lying down, and as suddenly rising; at other times lying stretched out on the backs; frequently looking backwards towards the sides; the ears and legs are extremely cold; and there is much sweating about the loins and flanks.

In these cases, large quantities of solid as well as fluid matters are constantly to be avoided as hurtful.

In remedying the disease, full bleeding is at first highly proper, with blistering and rowelling on the external surface of the belly; then the bowels should be well opened, by either mild purgative remedies, or, which is much better, by throwing up into them common clysters, composed of oatmeal gruel, salt, and oil, while just warm, as they act in a soothing manner, while they produce evacuation. Perspiration may likewise be promoted, by the use of antimonial powder, in combination with camphor and nitre, as often as there may be a necessity.

While the disease is in an active state, the horses should only take the lighter kinds of food, returning to the others by degrees. They should not be kept too warmly clothed in such cases.

INFLAMMATION OF THE LIVER.

This disease, though it is not by any means frequent, probably in consequence of the horse having no repository for the detention of the bile, by which it regularly flows into the bowels, and preserves the healthy condition of the part. The disease, however, sometimes occurs, when the appearances are these:

There is great loss of appetite, with uncommon restlessness, and a fulness and quickness in the pulse,, the eyes and inside of the mouth being slightly tinged with a yellowish cast. Urine is made in small quantities, and high in colour. There is a frequent turning of the head towards the right or affected side; and the places where the fore feet stand are frequently changed, as if the shoulder was pained.

In the cure of the complaint, it is at first necessary to bleed to the extent of several pints, according to the state of the animal, and then to open the bowels by such means as these:

Take of—Hard soap, sliced, three drachms,
Socotrine aloes, in fine powder, two drachms,
Submuriate of mercury, or calomel, two scruples and a half.

Leaves of senna, in powder, half an ounce,

Treacle, as much as is sufficient to make them into a ball; which may be continued at short intervals until sufficient evacuation be produced.

But where the larger intestines are much loaded, it may be better to make use of common clysters for the purpose, such as have been already noticed.

Suitable blisters may likewise be usefully applied, as near to the part which is affected, on the right side, as possible. And they may also be often put behind the fore legs with great effect.

In case the inflammation keeps up, so as to produce swellings and collections of matter, the hazard will be great, especially where they point and discharge themselves inwardly; but if outwardly, their contents may often be successfully let out and discharged by suitable openings being made and preserved until they are wholly removed.

The too great sinking of the animals is to be well guarded against, by the use of proper food and strengthening remedies when necessary. Mashes and oatmeal gruels being more frequently given when other sorts of food cannot be taken; but the horses should not be kept in too warm a state in any way.

INFLAMMATION OF THE KIDNEYS.

This is an affection that arises in horses from over exertion in drawing, or carrying too great loads, making too severe dead pulls, injuries done to the loins, stony matters collected in the parts, and too hard labour. When not quickly removed it too often ends in gangrene or collections of matter.

It first appears with heat and loss of appetite; there is great pain on pressing the loins; much inconvenience in moving backwards; the hind legs are kept much apart; the discharge of urine is either wholly prevented, or passed in very small portions at a time; and there is often blood mixed with it.

In order to remove the complaint, full bleeding is here, as in all other severe inflammatory cases, at first demanded, and to be repeated as necessary. The bowels should then be well emptied by mild purges, formed of aloes, soap, and calomel, or the use of common clysters, every sort of irritating matters being wholly avoided with the utmost care.

The drink directed below will, after these means, be useful in lessening the severity of the pain:

Take of—Acacia gum, or gum arabic, in powder, one ounce and a half; rub it well with

Infusion of linseed, three pints; then add,

Nitrate of potass, or nitre, half an ounce,

Antimonial powder, half a drachm,

Compound tincture of camphor, two drachms,

Treacle, one ounce; mix them, and make a drink, which may be given twice a day, until the disease becomes less violent.

Small doses of opium, in powder, and camphor, properly mixed, will also be sometimes very beneficial, as half a drachm or a drachm of the former, and two of the latter.

Embrocations of the spirit kind may be applied all over the loins, by rubbing them in lightly with the hand. The spirit of camphor, with a very little tincture of opium, will probably be the most proper for the purpose. The horses should be wholly kept to the stables or other houses, until such time as the inflammatory state is gone off; letting them be loose and have plenty of room where they are placed.

The diet should be wholly of the mash kind, with a little green food of the grass sort, when it can be had, the bowels being always kept in an open state. Liquids of all kinds should be allowed in a sparing manner.

In cases where the disease goes on, and matter is discharged with the urine, as some-

times happens, a ball, such as below, has been found useful.

Take of—Cinchona bark, or red bark, six drachms,
Camphor, in powder, one drachm and a half,
Hard soap, sliced, three drachms,
Liquorice root, in powder, half an ounce,
Copaiba, as much as will make them into a ball; which is to be given as there is occasion.

When the complaint has disappeared, great care will be required, in order to restore the animals, in feeding, cleaning, dressing, and managing them.

There is a state of the kidneys in which the loins are affected, and where blood is sometimes discharged with the urine, but which may take place without any inflammation whatever, as it may proceed wholly from a weakened state of the blood vessels of the parts, induced by excessive labour. In this state, the urine has mostly its natural cast, while the animal continues quiet in the stable, but whenever engaged in motion and work, it again occurs. Cases of this nature often give way simply to rest and a few warm mashes. But when necessary, remedies of the diuretic kind may be used, if wholly clear from inflammation, such as small doses of the nitrate of potass and sulphate of soda. Or a ball such as the following:

Take of—Hard soap, sliced, two drachms and a half.
Nitrate of potass, five drachms,
Yellow resin, in powder, three drachms,
Copaiba, as much as is proper to make them into a ball; to be given as necessary.

At the same time, applications of the softening discutient kinds, composed of the compound soap liniment, tincture of opium, and oil of turpentine, may be used on the loins with benefit.

In some cases of this sort, turning the horses to grass for a time speedily removes the disease, while in others, it is never wholly cured, but recurs whenever much exertion takes place in any way.

In all the states of the disease, much weight of any kind should be carefully prevented from bearing on the backs of the horses, until they are perfectly restored.

INFLAMMATION AND CONSTRICTION OF THE BLADDER OR ITS PARTS.

The diseases of these kinds are produced by such causes as any way impede or hinder the free passage of the urine, or the too long forced retention of it from any circumstance, and from other similar causes. The danger is much in proportion to the care, expedition, and attention, in applying the means of relief.

These attacks are shown by the appearance of fever, with frequent inclination to pass urine, without the means of passing any, or but very little at once; the standing of the horse in a very straddling manner with the hind legs; and often looking and turning the head towards the flanks; with frequent attempts to lie down and roll on the back. Where the neck of the bladder is only spasmodically constricted, it may be distinguished from the inflamed state of the bladder, by being found in one more or less full of urine, while in the other it is rather empty. In the former, when much distended, without its being quickly taken away, paralysis may be the consequence, and a total incapability of contraction be produced.

In the removing of these complaints less is probably to be done than in many others of the same nature. At first, however, bleeding to a proper extent, in relation to the state of the animal, will be highly beneficial. The bowels may then be well emptied by the use of cooling purgatives, or clysters composed of

oatmeal gruel and any common oil. After which a ball, as below, may often be given twice a day with great utility.

Take of—Antimonial powder two scruples and a half,
Opium, newly powdered, one scruple,
Camphor, powdered, two drachms,
Liquorice-root, in powder, half an ounce,
Treacle, as much as is necessary to make them into a ball, which may be given in a hornful of gruel while just warm.

All sorts of liquids should be used very sparingly, as well as every thing which tends to force urine. The food, in the time of the disease, should be principally mashes and gruel sparingly given, bringing the animal gradually to its usual diet.

Where the neck of the bladder is affected in the above manner, the use of medicines that force urine are carefully to be avoided as very hurtful. Warm water used in the manner of clysters, and fomentations properly hot, and sufficiently long applied by means of flannels wrung out of them, as near to the affected part as possible, will be the most proper and useful in removing the diseases in general.

SWELLING OF THE FORE PART OF THE BREAST.

This is an enlargement that sometimes takes place on the fore part of the heart or breast, and is occasionally so much extended upwards to the throat part as to threaten suffocation.

It may proceed from too hard riding, great exposure to cold, and giving cold water as drink when in a state of heat, and also from full feeding without proper exercise.

The signs of the diseases, besides the above, are the horses dropping their heads, refusing food, and not being able to put the head to the earth to pick up hay or grass. There is a faltering in the fore legs in walking, and the whole body has a trembling and unsteadiness about it.

Where the swelling is not to be reduced in the onset, it often becomes of a local dropsical nature; but, when of the more active kind, endeavours should be made to remove it by lessening the inflammatory state by early and full bleeding, and also by well opening the bowels by suitable clysters of the purgative kind, given as there may be occasion.

Where there is a necessity for much evacuation, use may be made of the following means:

Take of—Hard soap, sliced, half an ounce,
Socotrine aloes, in fine powder, four ounces
Submuriate of mercury, half a drachm,
Cascarilla, in powder, two drachms,
Sulphurated oil, as much as is wanted to make them into a ball, which may be given with proper mashes, and the water a little warm.

After the operation of the ball, where there is any sort of febrile state present, the remedy, as below, may be found of great service, taken as necessary:

Take of—Antimonial powder one drachm and a half,
Subcarbonate of potash, half an ounce,
Pure water one pint, dissolve them in it; then add
Tincture of ginger three drachms; mix them well; to be given in warm thin gruel.

The enlargement of the part may be well fomented for several times in the day with a hot fomentation of bran and water, or some other such kind. Where the swelling is of the soft dropsical sort, as known by its dimpling state, it may be scarified in several places, in order to let out the serous fluid, and reduce the swelling in the breast.

When the inflammatory state, in such cases, proceeds with such activity as to cause the formation of matter, it may be known to be present by the peculiarity of softness and

thinness of feel which there is in the part; in which case it may be let out in the more declining part, and, when fully discharged, should be preserved in the open state by means of proper pieces of lint or tow well spread with some good digestive substance. New portions may be applied daily until the wound begins to fill up in the bottom part, and the portion of the dressing afterwards be lessened as the hollow fills up. If spongy flesh arises in the edges of the part, a little dried alum or sulphate of copper, in fine powder, may be dusted over them as may be necessary; but, when they are smooth, and of a healthy red colour, nothing at all will be required. In cases, however, where the inflammatory state and swelling come on and increase in a rapid manner without any disposition to suppuration, and the producing of matter, repeated bleeding will become necessary in large quantities, and the part will require to be frequently fomented as above. In some instances, too, the tumor extends along the belly part quite to the sheath, which becomes likewise increased in dimensions; but the means of cure are much the same as those in the above sort.

STAGGERS.

In this disease, the head and brain of the horse are often much affected. It is more common to old hard-worked, worn-down, team horses than any other sort, though it sometimes attacks the younger, and those of other kinds. It may be produced by many different causes, as any thing that tends to create pressure on the brain or parts of it, by local external injuries near the parts, arising from blows from whips, sticks, and other weapons; and frequently, perhaps, it is occasioned by some irregularity in the digestive organ.

It is usually distinguished under two distinct heads, or kinds; in the former of which, with a feverish state, there are at first the uncommon appearances of great inactivity, sleepiness, and heaviness, with an almost constant hanging down of the head, so as to rest upon any thing that may be in the way; these symptoms are attended with great feebleness, and often with an obstructed or a constipated state of the bowels. When, as the disorder increases, the forehead is forcibly pressed against the wall, and upon attempting to move the animal, it has the appearance of being roused and livened up, but almost instantly returns to the same situation again. In this state there is but little apparent motion in the flanks, nor is the pulse much affected. Yet, if the advance of the disease be not restrained, its appearances soon become more formidable, and the brain is so affected as to cause great distraction and death. This state is termed the *sleepy staggers.*

In the latter, without any previous appearance of disease, the horse suddenly falls down, deprived of all voluntary motion; the eyes are insensible to the effect of light, the breathing is difficult and troublesome; there is much heaving in the flanks, and the beatings or pulsations in the vessels are rather quick and full. The horses make many endeavours to rise; but, after plunging violently about, fall again in the same insensible state and manner. This is called the *mad staggers.*

A third state somewhat of this sort, which may be termed a temporary staggers, may be noticed as occasionally taking place, in consequence of a hurry of the circulation, by either exercise, labour, or any other such means. It is marked by the sudden stopping of the horse, and the shaking of its head, if permitted to stand still a few moments, so as to let the violence of the circulation be over, the animal

will, in most cases, recover itself; but if imprudently forced on, the effect is so increased as to cause it to fall, and, in all probability, the most serious mischief will ensue.

In whatever cause the disease originates, the same means of relieving the system will be necessary, by first unloading the blood-vessels of the whole body, and, consequently, of the affected parts, by proper repeated bleeding; and the stomach and bowels, by suitable purgings; and as the complaint invariably terminates fatally, unless speedy relief be given, these means should be employed fully and effectually. When the first has been well accomplished, the latter may be attempted by the free use of such purging medicines as those directed below, the hardened contents of the rectum being first cleared out:

Take of—Socotrine aloes, in powder, six drachms,
Submuriate of mercury, one drachm and a half,
Root of jalap, in powder, half an ounce: mix and make them into a powder; to be given in a little thick oatmeal gruel, while just warm, and repeated as necessary.

In consequence of the great sluggishness and constipation of the bowels, in such cases, much larger doses of these substances may often be necessary. And where the large intestines are much filled, they may often be better and more conveniently relieved by the use of such clysters as the following:

Take of—Common oatmeal, made into thin gruel, two quarts,
Common salt, six ounces,
Olive oil, droppings, half a pint: mix and make them into a clyster, which is to be given while a little warm, being repeated as there may be occasion.

The effects of bleeding alone, are, however, sometimes so great, in these cases, that little more is required, in addition, to restore the horses, but rest, proper food, and good dressing; giving bran mashes, and water as drink, while just warm, and where such mashes and proper food cannot be sufficiently taken, supporting them by oatmeal gruel.

But where the disorder still continues after such evacuations, the following powder may be used with advantage:

Take of—Antimonial powder, half a drachm,
Nitrate of potass, one ounce,
Camphor, rubbed into fine powder, one drachm and a half.
Root of liquorice, in powder, half an ounce; mix them, and make a powder; which may be given in a hornful of gruel twice or oftener in the day, while necessary.

Blisters may be put on the parts behind the ears, or strong blistering ointment may be rubbed on them: and some persons prefer the blistering fly, in powder, mixed with spirits of wine for the same purpose, in the proportion of about a drachm to an ounce, rubbing the whole of the upper part of the neck on each side the mane from behind the ears. Setons, too, are proper to be inserted under the jaws and in the chest, to promote a free discharge, the latter being continued for some time after the horses are recovered.

Horses, in these cases, should always have plenty of room in the stables or sheds where they are kept, with a full and free circulation of air; and if they be so cleared and contrived, that the end of the halter or rein can be fixed to a hook or other means in the centre of the ceiling, so much the better, as they will thereby be prevented from injuring themselves, by running against the sides with their heads, being forced to move round in a circular manner.

LOSS OF POWER, OR PARALYTIC AFFECTIONS.

These affections take place in different ways; as in some there is the loss of the power of the whole side, and in others of the extremities only, as the hind legs; but there is generally

a complete loss of sensibility and nervous energy in all such cases. In the former of these states, the parts become wholly relaxed and in a flaccid condition, without having the capability of moving, and often without the sense of feeling in any way whatever.

The attack of the complaint is perceived by the use of some part of the limb being, either wholly or partially, taken away and lost, when in the extreme parts, one leg, and, in some cases, both suffer, as in the hind ones. These sorts of attacks are very unusual. They are, on some occasions, attended with constant shakings and tremblings; the former sort of these attacks, however, are not so frequent in their occurrence as the latter, but are more formidable.

In cases where one limb only is affected, there is seldom much danger, especially where there is a constant shaking and involuntary motion of the parts; but where both hind limbs are seized there is much difficulty and trouble, as, while the disease lasts, the horse is not able to stand without some kind of support. Where the use of the whole side is taken away, there can be no possible means contrived of keeping the animals up, and they are, therefore, in a desperate state until they get relief, or die. Horses often have a numbness of the limbs, and sometimes lose the use of them for a considerable time; but where the head is not affected, these affections are rarely of the true paralytic kind, and in such cases there is little danger to be apprehended. In all true cases of the paralytic kind, there is, for the most part, a thickness and siziness in the state of the blood, proceeding variously from too high keep, and want of proper exercise, bad sorts of food and fodder of all sorts, hurtful fumes, and impure air. This affection may likewise arise in consequence of too much hard work, and want of good keep; and on some occasions, from the circumstances attendant on old age, which is perhaps the most hopeless of all the states of the disease.

It is rarely worth while to attend much to such complaints as these in old horses; but in young ones, when they proceed from such causes as have been noticed, they often admit of relief and removal without much difficulty or trouble.

In these cases, bleeding should seldom if ever be had recourse to; but the bowels should in all cases, where necessary, be kept properly loose and open by means of proper clysters, or the more active kind of purges; which should be accompanied by embrocations of the stimulating kind, which may be beneficially applied frequently to the part that is affected. In this state, a ball of the kind below may often be very useful.

Take of—Guaiacum gum resin, in fine powder, one ounce,
Camphor, well rubbed down, with spirit, two drachms and a half,
Castor, in fine powder, two drachms,
Copaiba, as much as is sufficient to form them into a ball, to be given in warm gruel, and with the use of warm water at the time, as there may be occasion.

And an embrocation of the kind directed below may be freely used to the parts.

Take of—Camphor, dissolved in spirit, half an ounce,
Oil of Turpentine, six ounces,
Soft soap, one ounce and a half,
Tincture of opium, six drachms; mix them well together, so as to form them into a thin liniment for use, as directed below. It may be rubbed frequently on the part, and be gradually increased in its stimulating properties in proportion to the length of time it is used.

Before its application, the part should be well rubbed with a woollen cloth, that the liniment may take better effect, when a proper quantity may be rubbed in well on the part, and be repeated until there is a loss of the numbness, and the animal begins to use its

limbs again. When the numbness and loss of power is principally in the hind parts, the liniment may be applied on the back-bone and loins with good effect. It is always useful, too, to rub over the parts well with a hard brush.

Where there is much affection of the head and side, the use of the medicines should be continued, with the free use of the liniment. Some advise a mixture of fresh-ground mustard-seed with the spirit of camphor to be rubbed in upon the diseased limbs as being of great use: an ounce and a half of mustard to half a pint of the spirit of camphor may afterwards be used with benefit.

Where there is a tendency to heaviness in the head, less evacuation will be required. Clisters with setons in the neck and under the jaws with stimulant remedies of the volatile and other kinds are the most useful and proper in full quantities. By such means a cure of these diseases may often be effected.

EPILEPTIC AFFECTIONS.

These are of different kinds, as variously arising from too much fulness of blood, or from the deficiency of it, and also from old age, in which last state they are seldom to be cured.

On the attack of the disease, there are the appearances of a reeling and staggering in the animal's gait, the eyes are apparently fixed, they appear to have no sense of what is going on, the urine and dung are passed insensibly, the horse turns differently until it falls in a sudden manner in some cases, almost wholly motionless, with outstretched legs, as if lifeless, there being only a little extremely quick action about the heart and lungs, which is the cause of much lifting and working in the flanks, with occasionally involuntary shakings and motions of the extremities. As the fit goes off, there is usually a foaming at the mouth, which is of a dry white kind, when a sort of returning sensible state takes place.

In attempting the relief and cure of the disorder, the first thing that will be necessary is that of properly opening the bowels by suitable clysters, or the use of castor oil in sufficient quantity. When a mixture of the kind below may be found of use and benefit:

Take of—Camphor, well rubbed down with spirit, two drachms,
Antimonial powder, one drachm and a half,
Asafœtida gum resin, half an ounce,
Water, one pint, in which dissolve the whole;
Tincture of castor, half an ounce,
——— opium, two drachms: mix them so as to form a drink, which may be given in a little warm gruel, and repeated as necessary.

In some cases, the use of sulphate of zinc has been said to be of much advantage in putting a stop to the fits, and in ultimately removing the complaint. It may be begun with in the form as given below:

Take of—Sulphate of zinc, in powder, ten grains,
Extract of gentian, half an ounce,
Liquorice powder, three drachms,
Copaiba, as much as is necessary to form them into a ball, which may be given one every day or two in a little warm gruel as may be needful. It should be continued for some time in order to have the proper and full effect, and be increased in the quantity of the sulphate every few days during the use of it, proper food and drink being had recourse to at the same time.

COLICKY AFFECTIONS OF THE BOWELS, OR GRIPES.

These are very common to all sorts of horses, and, when improperly managed, they occasionally terminate in an unfavourable manner. They are produced by a great variety of causes, as the weak and enfeebled state of the bowels themselves, the irritation caused by the mucous or other matters they contain, the too severe exercise or work used, the drinking of too

much cold water, in a heated state of the body, and from the improper practice of riding horses into water in the state of perspiration. They may likewise happen from taking such food as is disposed to ferment and swell much in the stomach, as tares, clover, and such like, in the green state, as well as from many other causes of the same kinds.

They are shown to be present by the appearance of restlessness, and the whisking of the tail in the animal; the hind quarters are gathered up as if to lie down, and there is an alternate stamping with the hind feet, the belly being sometimes stricken. In the increasing disease, the animal very frequently lies down and rises up again, sometimes rolling about in the stall. The belly feels hard, and seems distended with wind. And, in the time of the attack, there is often an inclination to frequent staling, but without being able to effect it, as it arises from the nature of the disease, and mostly goes off with the other appearances of it.

In removing these attacks, in all cases, the use of frequent warm clysters will be instantly necessary, the hardened matters being first well cleared out of the rectum. Then a ball as below may be frequently given, until they be in some measure relieved, or wholly give way:

Take of—Hard opium, two scruples,
Asafœtida gum resin, one drachm and a half,
Camphor, rubbed fine, two drachms,
Caraway seeds, in powder, half an ounce,
Treacle, as much as will make them into a ball; to be given in a hornful of warm gruel as above.

The horse may have drinks given him, prepared by boiling a few bruised caraway-seeds in a gallon of water, and then putting into each a little oatmeal, when of a proper warmth. Good rubbing on each side under the belly, and giving a little gentle exercise, will also be proper, and highly useful, as by such means wind will often be freely expelled, and the attacks give way without being further troublesome. Common spirits, of some kind or other, are often largely given in these cases, but the remedy is hazardous, though it sometimes succeeds.

But where relief is not procured in a short time, the spasm in the bowels, in such cases, often increases, and puts on a dangerous inflammatory tendency and aspect, which are evidently shown by the state of the pulse, being small, quick, and weak. In this state the horse often lies on his back, for a little time, with the legs upwards; sometimes voiding small portions of hardened dung, but at others is affected with partial purgings that suddenly stop. The legs and ears are generally cold; and there are occasional breakings out of cold sweats. The animal has a slight swinging motion in the tail, and stands with the back in a rounded manner upwards.

If this state of the disease is not lessened, or wholly removed, in a very short time, mortification often takes place; when the horse appears to be more easy and free from pain, but which is a deceitful appearance, that soon terminates in death.

In the beginning of this state of the disease, rather full bleeding will first be necessary; after which clysters, composed of the sulphate of magnesia, in the quantity of four or six ounces, dissolved in a quart of thin oatmeal gruel, may be thrown up every hour or oftener, and the ball, as below, given and repeated frequently, until the disease abates.

Take of—Hard opium, half a drachm.
Asafœtida gum resin, one drachm and a half,
Socotrine aloes, in powder, half an ounce,
Leaves of senna, in powder, two drachms,
Sulphurated oil, as much as will make them into a ball, to be given as above.

Bran mashes, and water which has had the

cold taken off it, should be often put before the horses, keeping them quite in a quiet state, in some open place, where they may throw out their limbs freely, and roll without the danger of being hurt; and when they are recovered, mashes may be continued for a day or more, the quantity of common food being lessened.

SCOURS, OR PROFUSE DISCHARGES FROM THE BOWELS.

These diseases, which are frequently met with in horses, may arise from different causes, as deficient perspiration, drinking largely of cold water when overheated, acrid matters irritating the coats of the bowels, and from the lodging of insects or worms in the parts.

They are constantly marked by an excessive and frequent discharge of the contents of the bowels, attended with pain, restlessness, and much loss of appetite, with occasional severe gripings; and, after a day or two, with the expulsion chiefly of mucous intermixed with hard lumpy fæcal matters, which have a greasy appearance. When they have been disregarded, and the discharges are become involuntary, with a coldness in the extremities, the termination will mostly be of an unfavourable nature.

In all cases of this sort, however caused, except in a few instances, where they succeed acute disorders, and may be of a salutary nature, they should, if possible, be speedily removed. This is to be done by such means as will invigorate the bowels as well as the whole body, and afford the means of sheathing and defending the tender coats of the parts. Such as the following, though some persons first use purgatives, but perhaps on no very satisfactory grounds.

Take of—Burnt hartshorn, in powder, four ounces,
Prepared chalk, in powder, three ounces,
Linseed, bruised, six ounces,
Acacia gum, three ounces and a half,
Cassia bark, in coarse powder, three ounces; boil them in
Water, two quarts, for a little while, then pour off the liquor and add,
Tincture of opium, six drachms; mix them for a drink, which may be given every morning, as there may be a necessity, in a hornful of warm gruel and a little spirit of the common kind.

In all such cases, the food should consist of mashes of oatmeal and bran or malt, and the drink only thin gruel. Good rubbing should be occasionally used, and the places in which the animals are kept should be rather more than usually warm and quiet, and have plenty of good litter for them to lie on; and they never should be put to any sort of severe labour until freed from the disorder.

In the critical or salutary cases of this nature, as there is mostly a great degree of local weakness attending them, it may often be more beneficial to have recourse to other means than those of the correcting and agglutinating sort, as such as give power and a healthy action to the bowels and parts which are principally affected:

Take of—Socotrine aloes, in powder, two drachms and a half,
Rhubarb root, in powder, two drachms,
Cassia bark, in powder, half an ounce,
Submuriate of mercury, two scruples and a half,
Coriander seeds, powdered, half an ounce,
Treacle, as much as will make them into a ball, which is to be given in thick gruel as often as necessary.

In a little while afterwards, a powder, composed of aromatic cordial seeds, powdered rhubarb, and prepared chalk, in the proportion of four parts of the first and last to one of the other, may be given with very great advantage.

Drink, in these cases, should be given in rather a limited manner, and should have a small quantity of oatmeal or bran boiled in it. In cases of these sorts, a little common spirit

may sometimes be useful in giving excitement to the parts.

WORMS IN THE STOMACH AND BOWELS.

Worms are particularly common to horses, having an existence almost peculiar to them. They are extremely harassing and troublesome, producing much irritation, exhaustion, and mischief to their health and condition. The worms by which they are thus affected are principally of three kinds, the *ascarides*, the *teretes*, and the *oestus*, or bot. The first are generally found to inhabit the rectum, to be of white or reddish cast, as in the human subject, and of a small eel or needle-like form. They are very troublesome, frequently producing gripes and other irritating actions in the bowels; and breed at all times of the year, one breed, when destroyed, being often succeeded by another. They mostly abound in weak enfeebled states of the alimentary canal. The second sort, or those of the earth-worm kind, seldom give much disturbance, and would scarcely be known to be present, if they were not now and then observed to come away with the dung. One or two, and not more, at a time, are voided frequently by the animals, but occasionally the young brood are evacuated in rather full quantities, and of a size not much larger than the ascarides, but wholly of a red colour, without any white, as in the above sort. They prevail most in the autumn and beginning of winter, though occasionally one or two will be coming away at other times. The third or last sort is mostly of a brown appearance, being short, not more than half an inch in length, and of a thick chubby shape at the head, but quickly tapering to the tail; they are frequently found sticking to the less sensible parts of the stomach, in large quantities together, in bunches, which adhere very firmly to them. They are provided with pointed penetrating spiculæ, or mouths, from the heads; these pierce into the substance of the parts, which, becoming inflamed and ulcerated, allow them to penetrate still deeper, until it occasionally happens, that openings are thus produced quite through the parts. This worm is produced by the *ova* or eggs of a sort of female fly, which are deposited by it on the fore parts of the animals, in the early summer months, as May or June, whence they are taken or licked off by the horse, and carried into the stomach, where they hatch and fix themselves until the ensuing summer, when they quit their abodes, by dropping from the rectum, and in the proper length of time are changed into the fly state, which, as before, deposits ova or eggs, and the same process again takes place.

The signs that distinguish the presence of worms in these animals are, great restlessness, and irregularity in the appetite, with much leanness or emaciation, and a particular sort of staring in the hair of the coats of the horses. They often suffer pain from them, as is evident from their frequently striking their bellies with their hind feet, as in gripes, but not so violently. The voiding of the worms with the dung, and the shew of yellow marks, powder, or mucus, about the external parts of the rectum, fundament, or tail-root, are still more certain proofs of their presence. The bot kind are often found sticking out of or to the rectum, and are not unfrequently thrust out with the dung, together with a yellowish coloured matter, not unlike melted sulphur. They cause the horses to be restless, and to rub their breeches against any thing that happens to be in their way. They are seldom much seen after the times noticed above, and rarely continue more than two or three weeks in the same animal. In the stomach they are more

irritating and dangerous, by causing convulsions and other attacks, being seldom discovered, by any previous certain signs, before they bring the horses into much agony.

In the removal of these worms, little has yet been effected; the chief benefit that can with any certainty be relied upon being that of purging with different substances, and the use of mercurials in some form or other, but nothing has hitherto been done for their effectual destruction or expulsion. With respect to the bot kind, no means whatever have been devised of getting quit of them from the bodies of the animals, until that period at which they naturally come away in order to be transformed into the fly state.

Purging, by means of aloes and calomel, and proper attention to food, are useful in removing the two first sorts of worms, and the bots are got rid of by that which takes place on turning the horses to grass. There are other substances which, however, seem capable of having an equally or more powerful action in this way, such as the grey oxyd of quicksilver, antimony, and sulphur.

In cases of the first two sorts of worms the following may be beneficial:

Take of—Submuriate of mercury, two scruples,
Sacotrine aloes, in powder, six drachms,
Root of jalap, in powder, three drachms,
——— ginger, in powder, half an ounce; mix and make them into a powder, to be given in the morning in a hornful of thick gruel, repeating it once or twice at the distance of a fortnight.

This powder generally operates well without inconveniencing the horses in any way.

On some occasions, the form as below will be found more useful in destroying and expelling the worms:

Take of—Black sulphuret of mercury, five drachms,
Antimony prepared, finely powdered, three drachms,
Savine leaves, in powder, six drachms,
Ginger-root, powdered, half an ounce; mix and make a powder, to be given once or twice in the week in a little warm gruel.

Where other forms of mercury are thought improper, or are found to act in any way unfavourably, quicksilver may be rubbed well down, in the proportion of two drachms and a half or three drachms, with common turpentine, and then have purging substances mixed with it, so as to form a powder or ball, which will operate more mildly, and often with equal success. Proper mashes, and water a little warm, should be given with it at the same time; and it may be used once in the week or ten days. Good air and moderate exercise are always proper in these cases. Oil of turpentine, when given in full quantities, is said to have been found very effectual in the destruction and removal of worms in horses, and therefore is deserving of a fair trial in such cases.

YALLOWS OR JAUNDICE.

This is a disease which frequently takes place among horses, especially those of the working kinds, without fever or any inflammatory state being present. It may arise from any cause that creates severe action, especially of the local kind, on the liver itself, or from any sort of obstruction in the passage through which the bile is conveyed into the bowels or other parts; by which means that fluid is forced into the circulating system. It is generally attended with some local affection of the liver, to a greater or less extent; and it may proceed or be increased from want of free perspiration, in consequence of too much exposure to cold or moisture.

It is usually marked by a dull heavy pain on the side where the liver lies, extending towards the bowels: there is a dusky yellowness in the eyes, and on the inside of the mouth and lips,

as well as in the tongue and bars in the roof of the mouth, which usually takes place from the first indication of the disease. There is likewise a dulness, and a rejection of all kinds of food; the bowels are constipated with dry hard dung; the urine is mostly of a dirty, brown, dark colour; there is often pain and difficulty in staling, and if the disease be not soon restrained, it advances, in general, with considerable rapidity.

The removal of the disease, in these cases, will be more or less difficult, in proportion as the horses are affected with or free from morbid states of the liver. In cases where the liver is free from such states, and there is no sort of inflammatory tendency, the disease will readily give way to such remedies as these:

Take of—Hard soap, sliced, one ounce,
Yellow resin, in powder, six drachms,
Aloes, in powder, half an ounce,
Submuriate of mercury, one drachm,
Jalap-root, in powder, two drachms,
Copaiba, as much as is sufficient to make them into a ball; which may be given once in the day for two or three days.

If there be much dung in the large bowels, it will often be proper, in the first place, to remove it by clysters, or other means. When this has been done, and the ball has been taken as above, the powder which is prescribed in the following form may be used a few times, and will wholly remove the disease:

Take of—Subcarbonate of potass, six drachms,
Nitrate of potass, one ounce,
Root of turmeric, in powder, one ounce and a half,
Rhubarb-root, powdered, half an ounce,
Root of ginger, in powder, two drachms; mix them, and make a powder, to be given as above.

During the continuance of the disease, the horses should, for the most part, have warm grain, mashes, and water, as food and drink, and should be kept in rather a moderate state of warmth.

SUPPRESSION OF URINE, OR STRANGUARY.

This is a state of disease which sometimes happens to horses, without any appearance of fever, or any inflammatory disposition. It proceeds from a variety of different causes, as whatever tends greatly to affect the parts about the neck of the bladder, such as particular matters of food or drink, blows on the parts, the contraction produced by spasms of the muscles in the parts, and others of the same nature.

It is marked by great uneasiness, irritation, and loss of appetite, in the horses, with either a partial or total suppression of urine, but without any thing that denotes the presence of fever or inflammation in the parts.

In the first place, the bowels should be well cleared out by common clysters and mild laxative remedies, as castor oil, *&c.*; after which the following may be used:

Take of—Hard opium, in fresh powder, two scruples,
Camphor, rubbed fine, three drachms,
Hard soap, sliced, six drachms,
Nitrate of potass, in powder, three drachms,
Liquorice-root, powdered, half an ounce,
Copaiba, enough to make them into a ball; which is to be given once a day, in a pint and a half of the decoction directed below.

Take of—Linseed, bruised, six ounces,
Acacia gum, powdered, four ounces; boil them in Water, two quarts, for fifteen minutes, and then strain off the liquor for use as above.

It will be highly useful, while taking these medicines, to have flannel cloths frequently squeezed out of some hot fomentation of herbs and flowers, and applied to the parts between the legs of the horses, as near the neck of the bladder as possible. And the mashes they have should be given with as little water as they can be made, and the drink should be equally sparing, and a little warm when used.

EXCESSIVE OR PROFUSE STALING.

Most sorts of horses are liable to be attacked with this complaint, which arises from different causes, but chiefly from that of bad food, especially of the grain kind, when injured by the effects of salt water.

It is easily known by an abundant discharge of rather pale urine, attended with coldness of the skin, and a staring in the hair of the coat. When the complaint has continued for some time, there is great weakness of the whole body produced, with loss of appetite.

On the first attack of the disease, the following powder may be found useful:

Take of—Cinchona bark, called red, in powder, six drachms,
Hard opium, in fresh powder, half a drachm,
Alum, powdered, three drachms,
Root of bistort, in powder, two ounces and a half,
Coriander seeds, in powder, half an ounce; mix and make them into a powder; which is to be taken once in the day, in a hornful of warm gruel.

Water, which has stood for some time on caustic lime, may, in some cases, be used with benefit as drink, when not given in too large portions at a time. Opening mashes are to be given while the disorder continues, and after it is gone off, the horse should be supported by the best keep, with proper work or exercise, the legs and other parts being frequently well rubbed.

CHRONIC AFFECTIONS OF THE LUNGS, AS COUGHS AND CONSUMPTION.

These not unusually happen to horses on various accounts, and especially where they have laboured under acute diseases of such parts. Coughs in horses sometimes continue for a length of time, without producing much apparent injury to the health or condition of them, but which, if neglected, ultimately terminate in mischief. Diseases of this nature may arise from active colds of long standing, that have never been completely removed; from defluctions of different matters thrown upon the lungs when in a weak state, whereby they are excited into action in attempts to throw them off; from local irritating causes of various kinds, situated in different parts of the bronchia; and from several other causes.

In some cases of this sort, the horses breathe quicker than natural, and there is in the flanks a more quick motion than usual on any exertion, the cough being short and husky, and attended with frequent sneezing in attempts to expel, by the nose, the matters forced up by the cough. Much relief is constantly afforded while they continue to be so thrown off, but they return afterwards.

In these cases of cough, the means of cure are to be regulated principally by the circumstances in which the disease originates, as where it arises from and depends on other complaints, these are to be first considered and attended to; but where a cough comes on without any such causes, it may, in most cases, be removed, by such remedies as are directed below:

Take of—Hard opium, half a drachm,
Sublimed sulphur, half an ounce,
Myrrh, in powder, three drachms,
Common turpentine, one drachm and a half,
Liquorice-root, in powder, half an ounce,
Sulphurated oil, as much as is necessary to make them into a ball; which may be given in a pint and a half of linseed tea, once or oftener in the day, as there may be occasion.

The food, at the same time, should be softening and opening bran mashes, with roots of the most nourishing kinds that can be had; only very mild exercise or work should be allowed; and the stables or other places where the horses are kept should be rather warm, and the state of the air be preserved as equal as possible,

the drinks being also of a softening nature, and given while just warm.

Blisters, or blistering ointments, applied to the chest, or throat parts, may often be of great utility in affording relief in such cases.

In some cases, where the breathing is more troublesome, and the discharge of mucous matter from the lungs more difficult, the following form may be more useful in promoting the relief of the animals:

Take of—Gum ammoniacum, in powder, two drachms,
—— benzoin, in powder, two drachms and a half,
Powdered opium, fresh, two scruples,
Hard soap, sliced, three drachms,
Caraway seeds, in powder, half an ounce,
Copaiba, as much as is wanted to make them into a ball; which may be given in the same manner as the above, a similar attention being bestowed, with respect to keep, warmth, and exercise.

In the cases of consumption (which, though not common in horses, sometimes happens to them, in consequence of long-continued affections of the lungs, of the cold, cough, glander, and other kinds,) they lose their appetite and flesh in a quick manner, by frequent discharges of dung and urine, become weak and feeble, a sort of hectic fever comes on, often imperceptibly, and the disease fixes itself in some part of the lungs. The eyes have then a moisture and dulness in them; the ears and feet are commonly hot; there is a dry husky cough; and the horse groans when suddenly turned in the stall or other places, sneezes much on exposure to the cold air, discovers great uneasiness, with quick motion of the flanks, and, at times, discharges a yellowish curdled matter from the nose, which is a mark of the advanced state of the disease. The breath, also, becomes very fetid and offensive; little food is eaten at once; the hide is bound, and the coat, even in the summer season, is long, dry, and staring. When there is a continued wasting and loss of flesh and strength, it is a certain sign of the complete establishment of the disease, as the contrary shews the probability of a more favourable result.

As the active state of the disorder is generally over before any thing is required to be done, bleeding is but rarely necessary in such cases. The first step in the cure will, therefore, be, to open the bowels, when they are constipated, either by the use of clysters of the mild kind, or by such laxatives as operate in a gentle manner.

Take of—Castor oil, four ounces,
Sulphurated oil, half an ounce; mix, and give them in a hornful of thick warm gruel, as there may be occasion.

Or the powder as below may sometimes answer better:

Take of—Tartrate of potass, half an ounce,
Socotrine aloes, in powder, two drachms and a half,
Tartarized antimony, half a drachm,
Leaves of senna, in powder, half an ounce; mix them and make a powder, which may be given in a pint of warm beer in the morning, and repeated until the proper effect be produced.

Warm mashes and water as drink should be given while these means are employed, and when a proper open state of the bowels has been produced, the bolus as below may be had recourse to with benefit:

Take of—Hard opium, fresh powdered, and
Submuriate of mercury, each half a drachm,
Asafœtida gum-resin, one drachm and a half,
Benzoin gum, in powder, three drachms,
Liquorice-root, in powder, half an ounce,
Sulphurated oil, as much as is sufficient to make a ball; which may be given when necessary in the above manner.

The food and drink, in these cases, should be the same as above, with very moderate exercise, while the disease continues, and when the animals are recovered, particular regard

must be had to the quality of their keep, which should be dry, and of the best sorts, a small quantity being given at a time. They should also have as much fresh air as possible, when they are not in a heated state.

Where the horses waste away in flesh with the hide bound, but without almost any of the appearances that have been noticed above, as marking the disease, there will be little to be done in most cases.

BROKEN WIND.

This is a complaint somewhat peculiar to the horse, in which the lungs and parts about them are affected in a manner which is perhaps not yet thoroughly understood. It has been attributed to many different causes, as too great an enlargement of the lungs and whole contents of the chest, the breaking of the air-vessels of these parts into each other; the coagulable lymph of the blood extravasated and thrown out into the air cells, so as to plug them up and render the inspirations more frequent; the rupturing those cells by violent coughing or exercise instantly after being too much filled by food or water in the stomach; the effusion of water or other fluid matters into the chest and lungs; the paralysis of some of their parts; the destruction of a portion of them; and other causes of a similar kind.

Most commonly, for some time before this complaint makes its appearance, there is a continual dry cough, without much evident disorder or loss of appetite, but with an increased inclination for greedy foul-feeding, and for taking much water.

The commencement of the disease is marked by a frequent cough, great difficulty of breathing, much quick heaving in the flanks and belly, with alternate sudden risings and fallings in them, which continue in a regular manner, together with a windy state of the bowels. Most of these appearances become evident on squeezing the top of the throat with the hand, so as fully to show the presence of the disease.

In removing or relieving the complaint, the main objects will be to prevent the great distress of breathing, by lessening or removing the obstructing viscid matters in the lungs, and to strengthen the state of the whole system by giving a due stimulus to the body, by proper food and other ways.

For these purposes, first let the following powder be given for two or three times in a little thick oatmeal gruel in the evening, giving scalded bran mashes, and water, a little warm, at the same time; care also being taken to keep the horses well clothed and littered:

Take of—Submuriate of mercury, one drachm and a half,
Benzoin gum, in powder, three drachms,
Liquorice root, in powder, half an ounce,
Washed sulphur, one ounce; mix them and make a powder for use as above.

After the use of which, the ball as below, may be continued as there may be occasion:

Take of—Gum ammoniacum, in powder, two drachms,
Asafœtida gum resin, one drachm and a half,
Root of squill, in fresh powder, one drachm,
Antimonial powder, one scruple,
Liquorice root, powdered, half an ounce,
Copaiba, as much as will make them into a ball; to be used as directed above.

The bowels should be kept regularly open by proper food and gentle laxative medicine; good keep and water being frequently supplied in the day in small quantities at a time, such as good mashes and carrots. Very much depends upon nicely regulating the portions of food, drink, and work or exercise, so that they be always moderate; and they may sometimes be made moist with great benefit to the animals.

By these means, and the rather free use of water in which caustic lime has been slaked and stood in connexion with for some time, much advantage may often be gained in these complaints, so as to render the horses capable of performing work.

WATER IN THE CHEST, OR LOCAL DROPSY.

After diseases of the active inflammatory kind have terminated in such parts, collections of this kind frequently take place, and become very troublesome to the animals.

They may be suspected to have taken place, when, on the return of the desire for food in the horses, their strength does not in any way improve, their coughs continue distressing, with a disinclination to lie down, and their difficulty of breathing increases in rather a sudden manner.

Benefit, in these cases, is sometimes derived from the use of the ball as below:

Take of—Hard soap, sliced, one ounce,
Root of squill, in fresh powder, two drachms,
Submuriate of mercury, one drachm,
Root of ginger, in powder, half an ounce,
Copaiba, as much as will make them into a ball; which may be given once a day, as there may be occasion, in a hornful of warm beer.

The bowels should be kept regularly open by proper food or mild laxatives.

When the water has been in some measure removed, much advantage may be gained by the free use of bark and other strengthening remedies. And there is often great utility in putting a seton into some part of the chest, and keeping it discharging for some time; as well as from the application of strong blistering ointment, or blisters to the sides of that part.

The keep should be of the best kind, as good, sweet, old hay, full oats, and dry beans; and the exercise or work should be proportioned to the strength and powers of the animals.

In some cases, the water which is drank from off new-slaked lime is considered highly beneficial.

WATER FARCY, OR COLLECTIONS OF IT IN THE LEGS AND OTHER PARTS.

This is a disease which happens to all sorts of horses, and which is caused by whatever has a tendency to weaken and destroy the powers of the body, either locally or generally, such as low bad keep, want of proper cleaning and dressing, too much exposure to cold and wet, and many other causes. It is of the local dropsical kind, but has not the least relation or similarity to that which is usually termed *Farcy*, being, in its causes, appearances, and effects, very different, though often not sufficiently distinguished, from that disease.

It usually appears in the manner of a soft dimply swelling of the skin in some particular part, as in the legs or belly, and happens after severe colds, and other complaints, that leave great weakness behind them; but sometimes it has a more general dropsical cast, the water not being confined to such parts, but displayed in many different parts of the body, in swellings that yield to the pressure of the finger. It often proceeds from foul keep, or the effects of rich after-grass. In the former of the above states, the limbs and the body part are often very greatly swelled and enlarged, so as to become quite hard from the distention of the water.

In order to effect a cure in these cases, the water must be discharged, and the future formation of it be prevented. The former may be attempted by the use of strong, diuretic, purgative remedies, and the latter by means of the tonic strengthening kind;

Take of—Socotrine aloes, in powder, two drachms,
Submuriate of mercury, one drachm and a half,

Root of squill, in powder, two drachms,
——— jalap, in powder, half an ounce,
Copaiba, as much as will make them into a ball; to be given in a hornful of warm ale every evening for several times, as there may be occasion.

After which, oak bark, in powder, with aromatic cordial substances, may be given in large doses, as there may be a necessity, the horses having, at the same time, frequent mashes in which nitre has been dissolved.

EFFECTS OF SURFEIT IN HORSES.

These are common to most horses which are not properly kept, dressed, and managed, and proceed from several different causes, such as full bad keep, hard riding, sudden cooling after great heat, and the suppression of perspiration, however produced. They sometimes appear very suddenly, and as suddenly disappear, in which cases injury may be apprehended.

Their usual appearance is in the form of numerous small, knotty, and lumpy swellings or eruptions, that spread themselves over the surface of the skin or coat; and when these continue, the hide is affected with a lasting complaint, the hair, in spite of the best dressing, stares and looks dry and dirty; a scaly scurf runs over the whole, and is continually followed by new successions, until the affection be wholly removed. They are various in different cases, being sometimes in the manner of dry fixed scabs all over the body and legs; at others, they are attended with moisture, and with an itching heat of so sharp a nature, that the horses occasionally rub themselves sore; and in still other cases, there is no breaking out whatever, but merely a leanness with a constricted hide.

For the cure of these affections, many persons advise small bleedings in the beginning; but they can only be useful in a very few cases, where there is great action and irritation in the system and the affected surface parts; for in others, they must be wholly unnecessary, and often hurtful, by increasing the weakness of the animals,

It is proper, in most cases, and especially where the body is in a costive state, first to open the bowels by cooling mild purgatives of the saline or aloe kinds, and then to have recourse to alteratives of the less active sort as below:

Take of—Sulphuret of antimony, in fine powder, five drachms,
Black sulphuret of mercury, half an ounce,
Oak bark, finely powdered, two ounces; mix and make them into a powder; which may be given once or oftener in the day, as there may be occasion, in a hornful of gruel.

And once every day or two, a ball as below may be given at night with great benefit:

Take of—Hard soap, sliced, six drachms,
Common turpentine, three drachms and a half,
Yellow resin, in powder, one ounce,
Copaiba, as much as will make them into a ball for use, as above.

The horses, in these cases, should have bran, malt, or other such substances, made into mashes, which should be given twice in the day, an ounce or more of nitre being occasionally dissolved in them. Daily moderate exercise or work should be given, and moderate warmth be preserved in the places where they are kept. In some cases, where there is only a lumpiness, rubbing the skin well, so as to produce a state of warmth, is of great utility. But where there are scabs, that do not regularly fall off themselves, it will be useful to touch them over occasionally with the mild mercurial ointment. And, in case there be a deficient action in the absorbents on the skin, the rubbing in of the stronger sort of that ointment, to a moderate extent, may be highly serviceable in removing the complaint.

In cases where there is a moist discharge or constant oozing from the affected surface of the skin, a wash, such as below, may be found beneficial, after well cleaning the parts by means of a lather of the soft soap kind:

Take of—Sulphate of copper and zinc, each six drachms; dissolve them in

Soft water, three quarts; then add of

Solution of subacetate of lead, one drachm and a half,

Spirit of camphor, one ounce and a half; mix and make them into a wash; a little of which may be applied to the parts once or oftener in the day.

In these cases, the strength of the animals should be well kept up, and the bowels be preserved in an open state, by bran and barley mashes.

After these affections of the skin have been wholly removed, great use has sometimes been found from a few doses of aloes, rhubarb, and calomel, given in the form of a ball.

HIDE-BOUND.

This is an affection which sometimes requires the aid of medicine, though it can scarcely be properly called a disease, as it mostly takes place in consequence of some other severe disorder, or of bad keep with too hard work.

It is rendered evident, by the poor, low, weak state of the animal; by the great want of pliability, elasticity, and healthy feel of the hide or skin, which seems as if it were fixed to the ribs, instead of moving freely on them; also by the general roughness and staring of the hair of the coat, and sometimes by the partial or total loss of appetite.

Where this state is not produced in consequence of any other disease, a powder as below may often be useful:

Take of—Socotrine aloes, in powder, half an ounce,

Submuriate of mercury, one drachm,

Gentian-root, in powder, half an ounce,

Ginger-root, powdered, two drachms; mix them and make a powder, which may be given in a little thin gruel once a day for several times.

After which, the following powder may be used in its stead, for a week or two, and should be given in a quart of the warm infusion of malt:

Take of—Sulphuret of antimony, in fine powder, six drachms

Black sulphuret of mercury, three drachms,

Subcarbonate of iron, half an ounce,

Guaiacum resin, in powder, five drachms,

Caraway-seeds, powdered, half an ounce; mix and make them into a powder, to be given as above.

Good keep of every sort, and frequent mashes of the best kind, are, in these cases, essentially necessary, with proper attention to cleaning, dressing, and moderate working or exercise.

MANGE.

This is an unpleasant disease of the skin, which is much increased by improper feeding with bad food, want of cleanliness, and too much labour. It generally proceeds from infection, being communicated from one animal to another, either by contact, or by the use of articles which have been employed about diseased horses, by rubbing and touching the places where such animals have been kept, and by other similar means.

It usually begins with scabby eruptions about the roots of the hair in the skin, which are attended with great itching, and occasion rubbing of the parts, so as to cause the loss of the hair, and the consequent nakedness of the skin. These eruptions commonly first appear about the roots of the ears, the necks, the withers, the hips, and the tails, of the horses, whence they spread and extend to other parts, so as at last, when neglected, to nearly cover the whole bodies of the horses. There is a thick yellowish oozing takes place from them, which, when dry, becomes a sort of scurf, which shells

off, and is followed by new eruptions. An almost constant itching is present, which causes nearly a perpetual rubbing or biting of the parts, that produces much inconvenience and uneasiness to the horses, and that is greatly prejudicial to their feeding and condition.

In removing the complaint, there can never be any propriety in letting blood, though some have advised it, as the cure must be chiefly effected by suitable applications to the affected parts. A ball or powder of the following kind may, however, sometimes be usefully given for a few times:

Take of—Hard soap, sliced, six drachms,
Yellow resin, in powder, half an ounce,
Sublimed sulphur, six drachms,
Sulphurated oil, as much as will make them into a ball; to be given in the evening, for a few times, as may be necessary. Or,

Take of—Black sulphuret of mercury, six drachms,
Nitrate of potass, in powder, one ounce,
Ginger-root, in powder, half an ounce; mix and make them into a powder, to be given in warm gruel as the above.

At the same time, one or other of the ointments prescribed below, may be used to the parts every two or three days, as the nature of the case may require, they being first well washed and cleaned by a strong lather of soft soap and water:

Take of—Sublimed sulphur, four ounces,
Staves-acre seeds, in powder, one ounce,
White hellebore-root, in powder, one ounce and a half,
Prepared lard, half a pound; mix them into a soft ointment, by means of a little common oil; when a small portion may be well rubbed over the whole of the eruptions, or where they are about to appear. Or,

Take of—Sublimed sulphur, three ounces,
Strong mercurial ointment, two ounces and a half,
Prepared lard, three ounces and a half,
Soft soap, one ounce; mix and make a soft ointment, by adding a little oil.

A few applications of either of these ointments will, in most cases, remove the affection; but they should be used occasionally for a little while after the disease has disappeared.

During the continuance of the complaint, the horses should be well fed, cleaned, and dressed, being kept perfectly open in the bowels by frequent laxative mashes.

Strong washes of the sublimate kind are sometimes used in preference to the ointments, but they seldom answer so well.

In cases of this sort, care should be taken to have the harness and gearing of every sort as well as the racks, stalls, and mangers, well washed and cleaned, the former by soap and water, and the latter by strong lime-water, until they become quite free from the infectious matter.

FARCY.

This is a disorder which principally attacks horses of the team kind, and which, though it somewhat affects the whole habit, chiefly displays itself on the surface of the skin. It arises from a morbid state and action of the lymphatic vessels and glands, that become enlarged, obstructed, and by something offensive being taken up into them. These are very numerous in particular parts, as the insides of the legs and thighs. This disease is much increased by want of cleanliness, of proper food, dressing, and exercise.

On the first attack of such affections, the horses seem dull; there is a tightness and dryness in the feel of the skin, often attended with a slight swelling of the hind legs, which comes on suddenly, frequently increasing to a large size, particularly on the innner parts of the thighs. There are hard, sore, cord-like lines running on them, and irregularly at different distances, small, nut-like, hard, knotty buds or berries are formed, which, as they

increase, inflame, ulcerate, and discharge a thin corrosive ichorous fluid of an unhealthy nature. They sometimes appear on the necks, heads, and different other parts, taking on the appearances of other disorders, and causing much general weakness, and great loss of flesh. The condition of the horses is in fact every way bad and unhealthy.

As this is an affection which becomes rapidly more inveterate if relief be delayed, it should always be effectually removed on the first appearance. In the more slight cases, where it is confined to some one part, and where there is no considerable degree of swelling or inflammation present, it may sometimes be readily removed simply by mild alterative purges, as prescribed below, and the application of carrot or sour bran poultices to the affected parts, or the rubbing the diseased parts with strong blistering ointment.

Take of—Hard soap, sliced, three drachms,
Submuriate of mercury, one drachm,
Socotrine aloes, in powder, six drachms,
Ginger root, in powder, half an ounce,
Treacle, as much as will make them into a ball: which may be given in a little thick gruel, and repeated a few times, as there may be occasion.

Applications formed of sulphate of zinc, superacetate of lead, oil of turpentine, and lard; or of oil of turpentine, sulphuric acid, and tincture of opium, may likewise sometimes be very beneficially applied to the diseased parts in the beginning of such complaints.

But in the more severe, advanced, and inveterate cases of this sort, where the animals are strong, well fed, and in high condition, but not otherwise; moderate bleedings, in the more early stages of the disease, may be useful and necessary in lessening the inflammatory tendency.

After which, or without such bleedings in some cases, recourse must be had, as soon as the bowels have been properly opened, to such remedies as may increase the powers and action of the diseased vessels of the parts.

Take of—Opium, in fresh powder, one drachm,
Red oxyd of mercury, half a scruple,
Sulphuret of antimony, in powder, six drachms,
Guaiacum resin, in powder, half an ounce,
Antimonial powder, half a drachm,
Sulphurated oil, as much as will make them into a ball; to be given in the morning in a hornful of gruel, and repeated for several times as there may be occasion.

During the use of these medicines, the drink should be given a little warm, and mashes, with a little malt or grain in them, be often used in the same state; the animals being kept free from wet or cold, and rather warm.

A seton may also sometimes be put in, near the parts which are diseased, with much benefit. And where there are sharp corroding itchy ulcers forming, the edges of which are with difficulty healed, they may be occasionally washed in their several parts with a solution, such as is mentioned below, and be dressed with an ointment that has nitric-oxyd of mercury mixed with it, or some of this powder may be sprinkled over them every day or two.

Take of—Oxymuriate of mercury, two scruples; dissolve it in
Muriatic acid, twenty drops,
Rain-water, one pint,
Tincture of opium, two drachms and a half,
Compound tincture of benzoin, two ounces; mix them into a solution for use as above.

Sometimes solutions formed of the superacetate of lead and sulphate of zinc, with vinegar and tincture of myrrh, are found more beneficial.

Where the food is not taken freely, while under the above course, the use of aromatic powdered seeds may sometimes be found necessary; and the medicine in such cases should be deferred for a time.

In all cases, it is proper to remove the diseased

horses from those that are well; and if, when they are quite recovered, they can be turned out to grass, so much the better.

GREASE.

These sorts of affections are more common in working horses than in those of the road kind, being caused by whatever has a tendency to lessen or obstruct perspiration, or by the want of properly cleaning, rubbing, and drying of the legs or other parts immediately after work is over. From their nature and situation, these affections seem to arise principally in consequence of local weakness in the parts, and of the inactivity of the vessels that carry on the circulation of the fluids in them, either wholly or partially.

It has been surmised, that horses which have never had the hair cut from their heels are much less liable to these affections, than those which have had that operation performed on them. If such should be found to be really the fact, it naturally follows that the preserving the hair in the natural state about these parts, as a protection against the effects of wet, dirt, and cold, must be of much importance.

The name of the disease most probably originated in the greasy appearance that takes place in the discharge in such disorders.

In such affections, the appearances are commonly such as these; the hind legs, the parts usually the first and most affected, have the surface skin all about the joints of the fetlocks in a swelled and inflammatory state, which afterwards breaks and discharges a fetid disagreeable fluid. The diseased limbs are enlarged, the hair turning in an upward manner, to which succeeds some degree of lameness, there being a great disinclination to move them; the legs are raised considerably from the ground but returned to it again in a slow manner. There are chaps, cracks, or fissures, formed about the heels, that are often greatly increased and prevented from healing by the motion of the horses, which is therefore to be well guarded against. The fore legs are more rarely attacked. There would seem to be something peculiar in the discharge that attends these affections, either arising from their particular nature, or from the detention of it in or upon the parts that are diseased.

With the view of preventing such affections, the most material points are attention to exercise or labour, and cleanness in the dressing and managing the horses.

These affections, when taken in their more early stages, are commonly removed in a ready manner, but when suffered to continue until they become fixed and inveterate, they are often very obstinate and troublesome in their cure. Many different opinions have been held and brought forward in respect to their seat, nature, and causes, but little improvement has yet been made in the means of curing them.

In the more mild states of such affections, where the swellings are but trifling, and attended with but little inflammation or any sort of irritation, they are in most cases easily removed in their early stages by such means as these:

Take of—Acetate of potass, six drachms,
Socotrine aloes, in powder, three drachms,
Root of squill, in fresh powder, one drachm and a half,
Antimonial powder, two scruples,
Caraway seeds, in powder, one ounce; mix and make them into a powder, to be given in the evening in a little gruel, and repeated for several times, if necessary, the following solution being taken in the morning:

Take of—Oxymuriate of mercury, half a scruple, dissolve it in
Water, one pint,
Tincture of squills, six drachms; mix them and make a drink to be used as above.

The use of proper nourishing food, with suit-

able labour or exercise, and the occasional support of elastic bandages on the parts, should be well attended to at the same time. And in some cases it may be necessary and useful, previously to wash the parts well with lotions made of the sulphate of zinc, and a little of the solution of subacetate of lead, and water, with a small quantity of tincture of opium.

But in cases in which horses in full condition and strength are attacked with such complaints, and great inflammation and irritation are present, local bleedings on the insides of the thighs, or from near the parts, and sometimes general ones from the neck, to a sufficient extent, may be necessary. The parts which are affected should, at the same time, have the hair closely cut or shaved from them, and be well washed and cleaned by a strong lather of soft soap and warm water; after which, a warm turnip, carrot, or common poultice, formed with the solution of subacetate of lead, may be laid on the parts twice or three times in the day. And as soon as the swelling and irritation begin to decline and go off, as is generally the case in a few days, dried alum powder, in the quantity of three or four drachms, may be sprinkled over and mixed with each of the poultices; by which means such affections are often remedied in the space of a few days. Should, however, any ulcerations or cracks have been formed, and still continue to exist about the fetlock joints, as is often the case, they may be the most speedily cured, by means of properly dressing them with some mild digestive substance, kept tight to the part by a roller. While these topical means are in use, a ball, as below, may be given at night, every three or four days, for several times in warm gruel.

Take of—Hard soap, sliced, six drachms,
Submuriate of mercury, two scruples,
Yellow resin, in powder, five drachms,
Nitrate of potass, in powder, one ounce,
Root of squill, in powder, one drachm and a half,
Copaiba, as much as will make them into a ball; to be used as above.

The heels of the horses should be constantly kept well washed and cleaned, in the manner that has been directed above, and the exercise or labour should be regular and moderate.

In cases where, from length of time, such diseases become inveterate, the swelling, inflammation, and irritation, spreading extensively in the parts, and the surface skin being in part corroded by small ulcers, that leave a spongy lumpiness in it; the powers of the animals are generally much impaired and weakened, their bodies being often left in a very feeble condition. In such cases, there is a necessity for strengthening the constitution by tonic remedies, and good proper support of all kinds, with plenty of clean sweet litter in roomy stalls, the above ball being given as there may be occasion. The well-cleaned and cleared parts that are diseased should be fomented with the liquid produced from boiled softening herbs, with a little of the solution of subacetate of lead, for some time, twice a day or oftener, and a common poultice, made with strong vinegar and the lead solution, should be laid over them. Setons may be usefully inserted on the insides of the thighs or other parts near the affections, and be rendered more productive of action and discharge, when necessary, by the occasional smearing them with a small portion of some thin blistering liniment. And as the swellings subside, the parts should, if practicable, be well supported by the use of proper bandages of sufficient length put round them, when in the legs, from above the hoofs to more than the height of the hocks.

The ulcerations in the skin may be best removed by means of nitric-oxyd of mercury, in

fine powder, or the sulphate of copper, in the same fine state, being lightly sprinkled over them, covering the whole by a plaster formed by melting the soap plaster, in the quantity of a few ounces, with a little olive oil and super-acetate of lead. Strong acids are sometimes used in these compositions, but they are probably better employed alone, as they cannot be made to mix well with them. When such sores are wholly removed, the legs or other parts of the horses may be well rubbed or washed with the composition as below, continuing the use of the rollers:

Take of—Muriate of ammonia, in powder, one ounce and a half; dissolve it in
Acetic acid, one pint and a half,
Spirit of camphor, two ounces and a half,
Tincture of opium, two ounces; mix them and make a wash for use as above.

The affected parts, in these cases, generally retain their enlarged states, in consequence of the thickening of their superficial fleshy coverings, caused by the deposition of additional matter in them, and very frequently cannot be reduced again to their natural condition without some very severe means, such as the application of the actual cautery. When that is used, it should be carefully drawn in close lines from the fetlock joint to that of the hock, in cases where the hind legs are the seat of the disease. After which, in such trials, strong, blistering, unctuous matters may be employed on the parts, with the view of exciting greater action in the surface parts of them, and thereby causing the absorbent vessels to exert themselves more powerfully, so as to promote the reduction of the enlargements the most effectually.

When such diseases have been fully or sufficiently removed, it is always a good practice to turn the horses out into full pastures, and to let them occasionally have nourishing food of the provender kind.

POLL EVIL.

This is a swelling and fistular affection, that sometimes takes place about the polls of horses, near the joining of the necks and heads, and which, in most cases, proceeds from bruises caused by blows or hurts on the heads, by whips, or sticks, or by the striking their heads against any thing accidentally in throwing them up, and by many other such causes. It likewise sometimes arises from a disposition in the habit to farcy.

This affection usually first appears in the form and manner of a small tumor, that sometimes disperses and gives way, but which, at others, collects and fills with matter, in some state or other. It sometimes forms and runs in fistular sinuses, between the cervical muscles, when the ligaments and bones of the neck are not unfrequently affected. And when connected with farcy, there is a tightness and an unhealthiness in the appearance of the coat, with a knotty lumpiness in different parts, especially on the insides of the legs.

In all cases of the formation of such tumors, as they proceed generally, in a rapid manner, proper steps should instantly be taken to remove and disperse them by suitable means of the most active kind, such as cold discutient washes, and other such applications. Camphor, ammoniac, and spirits, in the manner prescribed below, may likewise be used with advantage in some cases, a purge being given at the same time, so as to open the body well:

Take of—Muriate of ammonia, in powder, three drachms and a half,
Camphor, two drachms; dissolve them in
Proof spirit, one pint,
Solution of subacetate of lead, one drachm,
Tincture of opium, half an ounce; mix them and make a wash, a little of which may be put gently on the part several times in the day

But if these tumors have proceeded so far

as the formation of matter, in that case, as soon as they have been brought to the proper state by suitable means, and that is distinctly ascertained by the pressure of the finger, a full opening lengthways of the necks of the horses should be made in the most depending parts of the swellings for its perfect discharge; and where they are large, a seton should be inserted, so as to pass the whole extents of their cavities, being often moved, softened, and cleaned by warm water and soft soap, or some more active fluid. A cure may, likewise, sometimes be made more speedy and effectual, by throwing occasionally into them a solution or mixture of the kind directed below, instead of the horrid practice which is too much resorted to, of pouring in scalding-hot substances of the liquid ointment kind:

Take of—Oxymuriate of mercury, one drachm and a half,
Sulphate of copper, one drachm; dissolve them in
Boiling water, one gill and a half; then add
Compound tincture of benzoin, one ounce and a half,
Proof spirit, one ounce; mix them and make a solution for use as above, once in the day or every two days.

In cases where it happens that, from inattention, openings of the fistular kind are formed in the parts, which cannot be removed by the use of setons, the greatest chance of success in attempting a cure is, probably, that of cutting and laying them open in their whole length, and then dressing them with the following detergent salve or ointment once a day, laying a plaster of common cerate over the whole:

Take of—Ointment of nitric oxyd of mercury, two ounces,
Black resin ointment, one ounce,
Oil of turpentine, two drachms,
Sulphate of copper, finely powdered, half a drachm; mix them into an ointment for the above purpose.

The ointments which are used in these cases should always be nicely suited in their strength to their particular uses, so as not to produce too much or too little stimulant action on the parts, as injury and mischief may arise in both ways. The great art consists in regulating the state of the inflammation in such a manner, as that the effect of healing may be produced, without carrying it so far as to cause injury, by the production of too great an increase in the granules of new flesh, or the formation of hollow pipy ulcers. Mild detergents, that correct and clean such wounds, are therefore always better, except in some particular cases, than the more active and powerful caustic substances, which give too much action, as the former will soon effect a cure in most cases of that description.

FISTULAR ULCERS IN THE WITHERS.

These diseases are sometimes very troublesome. They most commonly proceed from accidental injuries of the parts, occasioned by the friction of the harness and saddles, or by blows, or any other cause that may induce inflammation. Injuries and diseases of the bones will also produce these ulcers.

In these cases, the inflammatory action produces suppuration, and the matter which is formed, not being able to find any suitable outlet, naturally introduces itself, by slow degrees, into the membranous cells of the parts, where, lodging in the hollows between the different muscles, and running in several directions, fistular openings are formed, which constantly keep up a thin mattery discharge.

The first step in the undertaking of the cure in such pipy ulcers as these, is carefully to examine and ascertain the nature, extent, and direction in which they run, and how they are situated with reference to the large blood vessels, so as to judge of the danger of laying them completely open in their full extent. In

case there be no objection, on these grounds, the best and most efficient practice is that of fully opening them in the whole of their extent, so that the states of their inner parts may be well seen and decided upon. Then, as the surfaces of such ulcers are, in general, more or less in a callous and inactive state, by which the power of producing healthy matter is either wholly lost or much impaired, it, of course, becomes necessary, in the means of cure, first to change and destroy the morbid inaction of such surfaces, which is to be done by applications of the milder caustic kinds, continued until such time as the diseased parts are cast off in the manner of sloughs. This is most perfectly and expeditiously accomplished by the use of the solution prescribed below:

Take of—Oxymuriate of mercury, one drachm and a half,
Sulphate of copper, half a drachm; dissolve them in
Proof spirit, three ounces; and make a solution for the above purpose.

A dressing well moistened with this solution may be used to the part once in the course of four or five days, as there may be occasion, when the superficial parts on which it acts will be destroyed, separate, and come away, leaving the surfaces underneath them in a clean healthy state, so as to form granulations, that merely require occasionally to be cleansed; and when they rise too high, to have a little of some powder, such as the nitric oxyd of mercury, now and then sprinkled on their upper parts, by means of which the wounds, in most cases, soon take on the healing state.

AFFECTIONS OF THE EYES.

These affections are of different kinds, as they arise from different causes, and are seated in the different parts of the eyes. Those which are caused by and depend on inflammation, are capable of being distinguished into two sorts, external and internal, or those which affect and have their seats in the outward surfaces, the coverings, or other connected parts of the eyelids; and those which affect, or are seated in, the coats or parts of the eyes themselves. There is also a disease of these parts which arises from an affection of the optic nerves. Some of these affections are readily and easily curable, while others are cured with difficulty, or are incurable; but few should be considered of the last kind, except where the sight is wholly lost by the morbid state of some of the parts.

INFLAMMATIONS OF THE EYES.

Inflammation in the external parts of the eyes, and those connected with them, may take place from various causes, such as blows given by whips and sticks, the dropping of different extraneous matters into the eyes, which, remaining there, cause irritation; as also from the horses being in too high a state of condition, with costiveness, from want of proper air and exercise, and likewise from the effects of stimulant vapours: these last causes, also, operate by affecting the inner coats or parts in this way.

In all such cases, whether the eyes are externally or internally affected, they become inflamed in some degree; the eyelids swell much, and are often nearly closed; the water of the tears, which is often very acrid, passes down over the cheeks, and the irritation from the admission of light is prevented by the haw or curtain of the eye, being more or less drawn over its ball. Besides these appearances, when the coats and inner parts are affected, the surface of the transparent cornea or external coat, is suddenly inflamed, loses its transparency, and has a duskish suffusion or opaqueness passing over it, which is produced by the effusion of the lymph of the blood between the

layers of which it is composed, and the pupil is more than usually contracted. And where the crystalline lens becomes affected, there is seldom much swelling or inflammation taking place externally, but the capsule of it appears dull and opaque; a darkish white speck takes place in the middle of the sight, and sometimes there is a yellowish ropy fluid floating in the fore part of the eye. The pupil of that eye is generally more contracted than that of the other eye, not varying its size, in general, when put in different situations of light; the sight is imperfect, so as, in some measure, to cause the horses to shy; the eye lessens in its bulk, and the upper eye-lid has the appearance of sinking and shrivelling, probably in consequence of the wasting of the gland that secretes the tears, and of its not performing that office to a sufficient extent for its intended purpose.

In the first of these cases, or those which arise from external injuries, of the eyes and parts about them, notwithstanding the inflammation that takes place in the lids or their internal adjoining parts, in consequence of their being wounded, bruised, or otherwise hurt, often gradually spreads and extends itself in such a manner as to affect the different parts of the surface coats of the eyes themselves; yet the accidents that are caused in this way are rarely productive of an absolute loss of sight, when well attended to and managed. The redness and fulness in the blood vessels, perceivable on gently drawing the eye-lids back, in some instances, and the dulness and loss of clearness that take place in the transparent parts of the surface coats of the eyes in others, are seldom of so much danger as is too commonly apprehended; for though such injuries and affections of the eyes may, in some cases, at first produce perfect darkness, yet as the inflammatory state of them goes off, or becomes dispersed, the sight in general is again restored. The sight is, therefore, only completely and wholly lost or destroyed, in such cases, when the coats or coverings of the eyes are deeply and largely wounded, hurt, or burst, by some very severe accident.

In the next cases of these kinds, or those where the inner coats of the eyes become affected, the disease occasionally attacks both eyes at once, but more frequently only one; for as one gets better, the other is attacked, proceeding in this alternate manner often, until the loss of one or both eyes. It happens in different situations and circumstances, but most frequently where there are many horses kept together, arising, perhaps, in some degree, from too close stables, and the want of a more free and full circulation of air; the standing too long on litter that is in a state of heat, and throwing up an irritating saline vapour that greatly affects such parts, and also from hard irregular working in a damp situation and atmosphere. When it proceeds from constitutional causes, it is the most difficult of cure.

In the last of these cases, which is readily discovered on inspection, and which is generally the consequence of the spreading state of inflammation in the parts, by which an obstruction of the rays of light is caused, and, at last, a total loss of sight takes place. It sometimes comes on in so slow and imperceptible a manner, and with so little inflammatory action in the parts, that it is not discovered until it has become wholly incurable. But in others, the whole substance of the lens becomes in a dark opaque state in a very short time.

In the removal of all these different inflammatory states of the eyes in horses, bleeding will at first be necessary, in most cases, in proportion to the nature and extent of such causes. In the first, or where the eyes are externally

affected, the seat of the inflammation should always be well ascertained, and then local or general bleeding, or both, be employed as may be proper, when the purging ball and application, as prescribed below, may be had recourse to, the latter being used quite cold, and often renewed:

Take of—Submuriate of mercury, three scruples and a half,
Socotrine aloes, in powder, three drachms and a half,
Hard soap, sliced, half an ounce,
Treacle, sufficient to make them into a ball; which may be given every evening, as there may be occasion.

Take of—Linseed meal, four ounces,
Olive oil droppings, three drachms,
Diluted solution of subacetate of lead, as much as will make it of a proper thickness to be applied as above.

Where the eye-lids are much affected, and there is much inflammatory action present, the blood vessels of the parts may often be favourably unloaded, by cutting them on the insides by means of a small lancet, or by opening the angular vein, or that which passes down the side of the face from the eye. After which, a wash, such as that directed below, may be used with much advantage, keeping the eye constantly wet with it, by frequently applying to it a linen cloth well moistened with the liquid.

Take of—Sulphate of zinc, one drachm and a half,
Solution of subacetate of lead, one drachm.
Rain water, one pint; mix them and make a wash to be applied as above.

But in case such inflammations continue for many days, without decreasing in any material degree, setons or rowels may be put in under the jaws of the horses, and will be found very beneficial in removing the inflammatory state.

During the cure, mashes, with bran and warm water, may be used rather freely, but hard dry food, should be very sparingly employed, and that which is laxative and cooling will commonly be the most proper.

When the inflammatory attacks in such parts are more of the internal or second kind, after sufficient bleeding has been practised, and the bowels have been well opened by the ball that has been advised above, a powder, such as the following, may be given daily, and a wash, such as that below, be frequently used:

Take of—Submuriate of mercury, one scruple,
Antimonial powder, two scruples,
Nitrate of potass, one ounce,
Ginger-root, in powder, one ounce and a half; mix and make them into a powder, to be given in a little warm thin gruel.

In the place of the above wash, that which is directed below is sometimes found more useful:

Take of—Solution of subacetate of lead, one drachm,
Tincture of opium, half a drachm,
Proof spirits, three ounces,
Rain water, two pints; mix and make them into a wash, to be used in the same manner as the above.

When the inflammation in some measure continues, but without much action in the parts, a lotion composed in the manner prescribed below, often answers well:

Take of—Red rose petals, dried, two drachms,
Hard opium, cut small, one drachm and a half,
Camphor, finely rubbed down and dissolved, two drachms, pour on them
Boiling water, one pint and a half; and let them stand in the covered state until cold; then to the clear strained liquor, add
Solution of subacetate of lead, one drachm,
Tincture of opium, two drachms; mix and make them into a wash, to be applied frequently to the affected parts, keeping them constantly wet, at the same time, with the first of the above applications.

Large blisters applied near to the affected eyes are likewise often very useful in these cases, as also the insertion of rowels about the jaws.

Balls formed of the nitrate of potass, yellow resin, and common turpentine, are likewise often occasionally given with great advantage in these cases.

In all such cases, the exercise or daily work should be moderate, the air of the stables be free, and the diet moist and opening, with plenty of litter for the horses to lie on.

It not unfrequently happens in cases of these kinds, that after the inflammatory states of them are wholly or in some measure removed, there appears a sort of dull thickish whiteness throughout the whole surface of the balls of the eyes, that wholly or in a great part impedes the rays of light; this is to be carefully taken away, when the great action in the parts has subsided, by mild and gentle stimulant means, that promote the taking up the lymph diffused between the coats of the eyes, thereby affecting the power of sight. But too sharp active powdery substances should by no means be used for the purpose, as has been too often the case. The proper remedies in such cases are probably the inserting a few drops of the tincture of opium on lint between the eyes and their lids occasionally, or that of a very weak solution of the oxymuriate of mercury in water. The touching the haw or membrane of the eye in a very slight manner by the nitrate of silver, may likewise in some cases answer the same purpose very perfectly. Blistering near the parts with a soft oily liniment of that sort may often have the desired effect, or assist in producing it. It should be rubbed well in near the parts, the horse being in some way well secured from rubbing it off during the time of its operation. Common salt, in the state of fine powder blown by means of a quill into the eye in a suitably small proportion, is advised by some, as answering well in such cases; but the washing of the parts with a weak solution of it in pure water, would probably act more favourably in promoting the necessary absorption.

The nature of the eye, in some measure disposes some horses more than others to these affections, as they are more common in such as have small eyes, and the upper lids much furrowed or shrivelled, or what is usually termed *buck eyed.* When kept too much in the stable, without work or exercise, such horses are, from their third or fourth to their sixth year, very subject to be affected with diseases of this sort. Attention to proper exercise or work and feeding, is consequently always to be well regarded in such cases.

In the last case, or where the crystalline lens is diseased, the cure is at first to be attempted by proper bleeding and blistering, and by such remedies as promote absorption. When properly active, the effects of absorption soon appear, by the gradual diminishing of the opacity; but which, in many cases, is not wholly removed, a yellowish white speck being left, which often denotes that the eye has been previously affected, though it may have become sound and clear again. However, wherever such opacities are not remedied in a short time after their primary attacks, the absorbent vessels of the parts are liable to become in an inactive state, and an incurable state of blindness to be the consequence. In these circumstances, little in general can be done, but in some particular instances, benefit may be derived from the use of the submuriate of mercury, or the oxymuriate of the same, when persevered in for some time as alteratives, in connexion with setons and strong blistering substances, inserted in and applied to the parts underneath and near to the jaws or other places, as little distant from the eyes as possible, and at the same time keeping the bowels well open.

The method of removing the affection by the depression or extraction of the diseased lens, as in the human eye, if it was easily and

properly practicable, would, in this case, be wholly useless, from the want of the capability of having the necessary glasses. The different diseased states of the eye are shown in the subjoined *plate*.

LOSS OF POWER IN THE OPTIC NERVE.

This is a disease of the eye of a different nature, and with which horses are liable to be affected. The appearance of that organ is so little altered in this disease, that the affection can scarcely be known to exist, unless by those who are considerably experienced in such matters; so that horses may be often bought and sold without either party knowing that they are so affected. It arises from a loss of power in the retina, or principal nerve, that is spread out in the bottom of the eye, occasioned by hurts or changes which take place in the brain or parts adjacent. There is a complete insensibility to the action of the rays of light, and the eye looks as when in its perfect state.

The disease is usually termed *gutta serena;* and is marked by a dilatation and enlargement of the pupil of the eye, that continues equally the same when the light is weak and when it is the most vivid, with the signs of want of sight in the animal. The eye has a more glassy appearance, and the lid of it is generally more raised than in that which is perfect, the white part of the ball being more exposed. By placing the horse opposite to a full strong light, and seeing whether the pupils of the different eyes contract freely, as they constantly do in the perfect state, the presence of the affection may be easily ascertained; as where there is no contraction taking place in the pupil of one of the eyes, it is a sure sign that the horse is blind of that eye.

In affections of this kind, there is seldom much hope of cure; but benefit may, in some cases, be derived, from the internal use of a weak solution of oxymuriate of mercury, in connexion with substances of the bark and other strengthening kinds, when continued for some time, so as to produce a change in the state of the diseased parts, which medicines will be greatly assisted by salt-marsh or good fresh grass pastures. Where the disease is in its early state, and proceeds from blows or staggers, advantage may be gained from stimulating substances being applied to the nose, such as the fumes of the sulphuric acid and salt, and the application of blisters to the head. But when the complaint has continued for any length of time, it will rarely admit of cure by any means which have yet been discovered.

LAMPAS, OR ENLARGEMENT OF THE BARS OF THE MOUTH.

This is a complaint that often becomes troublesome in the mouths of young horses, by the bars of them becoming so enlarged as to prevent, in some cases, the due mastication of the food and the process of digestion.

The bars or transverse ridges that cross the roof or upper part of the mouth in the horse, are so swelled in this disease, that they rise up as high or higher than the front teeth in it, are very sore, and render the feeding difficult and uneasy.

The cure is usually effected by burning them down with a hot iron proper for the purpose. But the same end may be answered equally well, and in a less painful and harsh manner, by very slightly scarifying their surfaces with a sharp lancet, and letting them bleed freely, by which process they will be speedily reduced to the natural state. In many cases, such swellings or risings in the bars of the mouth may be sufficiently checked and kept down, by the full and proper application of strong decoctions or infusions of the most powerful vegetable astringent substances, such as galls and

States of Perfect & Diseased Eyes.

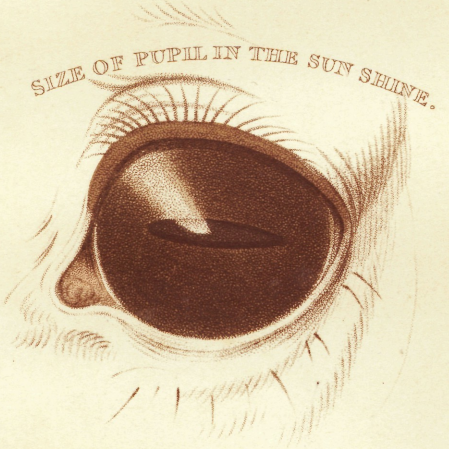
Perfect Eyes.



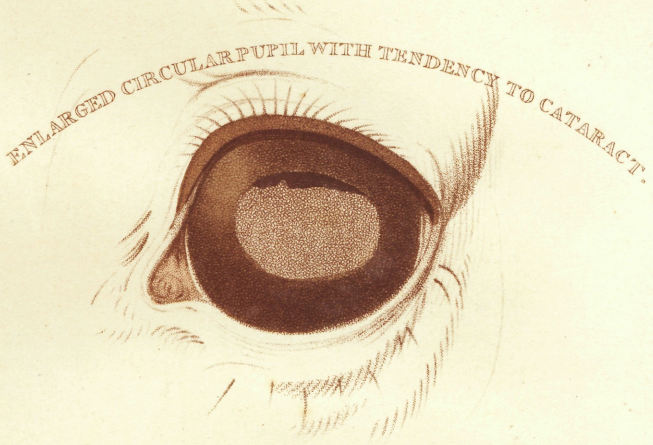
Size of Pupil in the Shade.



Size of Pupil in a Moderate Light.

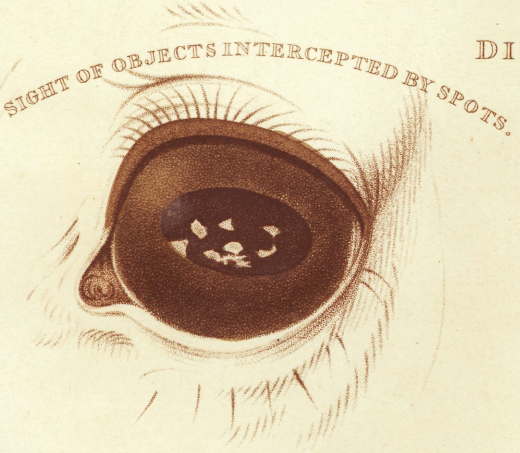


Size of Pupil in the Sun Shine.



Enlarged Circular Pupil with Tendency to Cataract.

Diseased Eyes.



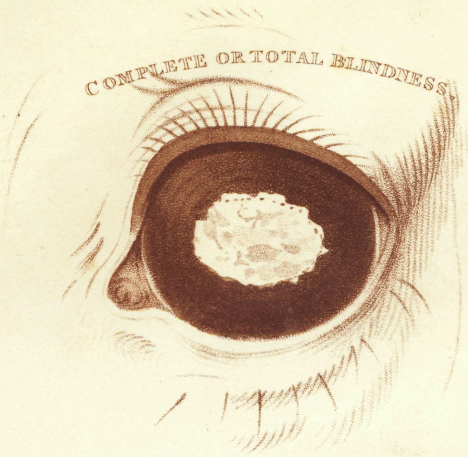
Sight of Objects Intercepted by Spots.



Opaque Spots without Intercepting the Sight before or beneath the Eye.



Contracted Pupil approaching to Blindness.



Complete or Total Blindness.

London. Published by Tho.s Kelly 17. Paternoster Row. March 13. 1824.

different barks, with alum or other such matters dissolved in them.

LAMENESS, OR STRAINS IN THE JOINTS, LIGAMENTS, AND TENDONS, AND DISEASES OF THE BONES.

These kinds of affections are less common in the large than the small joints, but they occasionally happen in most of them, and produce greater or less degrees of lameness, though the hoofs and feet are by far the most frequent seats of such diseases.

In every case of this nature, where the external appearances do not fully and sufficiently point out the seat of the disease, every circumstance that can tend to throw light on that point, and on the nature of its origin and formation, must be well examined into. In cases where the larger joints are the seats of the disease, the signs will be evident from the manner in which the horse moves or drags the limb that is affected; but where the smaller leg joints or the tendons are the suspected parts, there is often more difficulty in the decision. It is usual, in these cases, to determine the limb that is injured, by having the horses put into sharp motion; and when that has been ascertained, to examine carefully for the real seat of the disease. When strains of the back tendons of the legs give rise to the complaint, there is, in most cases, a considerable increase of heat, pain, and swelling in the parts, but as the same appearances are not unfrequently present in diseases of the feet, they are not always to be relied upon as indicating the actual seats of these diseases. The feet are, of course, to be carefully examined at the same time, to see whether the usual heat in them is increased or not, which, if it be, the shoes should be removed; as in many cases, where the strains have been considered to be in the back tendons or joints of the legs, on inspecting the feet in every part, after removing the shoes, the causes and seats of the diseases have been found to be in them, proceeding from the spreading inflammation induced in various ways, as by corns, wounds, pricks, and similar other causes.

LAMENESS IN THE SHOULDER JOINT.

This case is by no means so common as is usually supposed, but it occasionally happens in consequence of the over-distention of the muscles of the part, by the leg slipping or spreading too much sideways from the body, and by some other such causes.

It is readily distinguished from such affections in any other part of the limb, by the particularly singular manner in which the horse draws its leg forward, by dragging the toe, and at every step carrying it forward in a sort of outward circular method, probably in consequence of the incapability of throwing the muscles into action, so as to bend the knee joint.

In the removal of such lamenesses in their primary attacks, where inflammation and a state of fever are in some degree present, the taking away a little blood from the plate vein, and the giving the powder prescribed below, may sometimes be necessary:

Take of—Camphor, rubbed fine, one drachm and a half,
Antimonial powder, half a drachm,
Nitrate of potass, in powder, one ounce,
Liquorice root, in powder, one ounce and a half; mix and make them into a powder, to be given once or oftener in the day, as there may be occasion, in a little warm liquid mash.

Bathing and fomenting the parts and all those near them well with hot bran and water, or boiled herbs and flowers, will be found very beneficial in the beginning of such affections. After

which they may be well rubbed and embrocated with such applications as the following:

Take of—Spirit of camphor, two ounces,
Tincture of opium, three drachms; mix them for the above use.

Where there is great stiffness in the parts, the mixture as below is often more useful:

Take of—Olive oil, two ounces and a half,
Oil of origanum, two drachms,
Spirit of ammonia, three drachms; mix and apply them as already directed.

But where there is great loss of power in the limb, with numbness, an embrocation of the following sort is commonly the most effectual:

Take of—Camphor, half an ounce; dissolve it in
Proof spirit, eight ounces,
Solution of subcarbonate of ammonia, one ounce and a half,
Compound soap liniment, two ounces,
Tincture of opium, one ounce; mix and make them into an embrocation, to be used two or three times in the day.

It may be useful, also, to put a seton into some part of the chest, as near the seat of the disease as possible, and to continue it as there may be occasion; and where such lamenesses still remain, large strong blisters may be applied to the parts, and the horses be then turned out for a time into salt-marsh or other good pastures.

The affections of this sort, in these parts, are more difficult and troublesome than those of many others in their removal, requiring longer rest and more attention, as they are very liable to return from the slightest causes.

During the cure, when in the house, the horses should have full room, be encouraged when they can to move about, and they should also be walked out, and gently worked as soon as they are able to bear exercise.

LAMENESS IN THE ROUND, OR WHIRLE-BONE OF THE HIP AND STIFLE.

In the former, which is the bone forming the hip joint, there is seldom any affection of this nature, as from the part being surrounded and covered so thickly with large and powerful muscles, it is almost impossible that it can sustain any injuries of these kinds. It may, however, occasionally happen, that the ligaments which secure and keep the head of the thigh bone in its socket may become affected in this way by particular circumstances. It is not unusual to mistake affections in this part for those in the hock, though the appearances are wholly different.

In this kind of lameness, the horse is under the necessity of dragging the leg forward, after partially raising it on the toe, so as somewhat to rest on the ground.

Where the stifle is affected, which is very rarely the case, the disease is generally produced in consequence of blows, of kicks from other horses, or from some other similar cause.

The cure, in all such cases of both kinds, is effected by the free use of such camphorated spirituous embrocations as have been directed above, or by the frequent application of strong blistering matters to the parts.

LAMENESS IN THE KNEE, FETLOCK, AND COFFIN JOINTS, AND IN THE BACK TENDONS AND LIGAMENTS, FROM STRAINS AND OTHER CAUSES.

When these sorts of lamenesses are confined to any of these parts, in any of the extremities, and when they are attended to in the early state, they may generally be removed without any great difficulty.

Where the knee joint is affected in this way, there is an awkward stiffness in moving the leg forwards, just along the surface of the ground, without the ability of lifting it up.

When the fetlock joint is the seat of the lameness, there is an equal degree of stiffness and

want of motion in that part, which makes the horse proceed forward with the leg in a fixed straight manner.

And when the coffin joint is the part affected, the horse stands with the toe in a forward direction, so as to preserve the pastern in a right line with the leg, and in that way lessen the extension of the ligaments. Where affections of this kind are suffered to be of long standing before they are attended to, they are commonly incurable, as in the latter stages of the disease, the ligamentous parts which form the union between the coffin bone and the lower pastern bone, become, in some measure, changed into the bony state, so as wholly to lose the use of the joint. And it is likewise not unfrequently the case, that that part of the flexor tendon of the leg that is fixed to the under surface of the coffin-bone, forming its tendinous aponeurosis is in the same state, so as to hinder its action in the sheathy covering that contains it.

When the back tendons, or the sheaths that enclose them, are the seats of the disease, as in the well-known cases of strains in the back sinews, the parts just above the fetlock joint are generally those which are affected ; but the tendons themselves are far less frequently so than the sheaths in which they are confined. They usually arise from too great exertion in some way or other, as in galloping on hard surfaces, and by a blow from the toe of the hind foot, as in hunting over heavy soils, where the fore leg is detained too long from moving, by fastening in the clayey matters, and by other causes of a similar nature.

The cases in which the suspensor ligaments of the legs give way, and cause what is termed breaking down, are accidents of a still more serious kind, as they rarely admit of a cure. They have often mistakenly been supposed to be affections of the tendons.

In cases where these ligaments become ruptured, the joint of the fetlock, instead of keeping its natural slanting direction, drops down, so as to reach nearly to the ground ; yet the tendons have still the power of bending the leg, which could not be the case, if they were disunited or broken.

The means of cure, in these different cases, will vary according to the nature of them. When the knees or fetlock joints are the seats of the complaints, the use of a discutient poultice, such as below, may be necessary for the first three or four days:

Take of—Good bran, a fourth of a peck ; boil it a little in
Water, as much as is necessary ; and as it cools add,
Superacetate of lead, two drachms,
Lard, two ounces ; mix and make them into a poultice, which should be applied over the whole of the affected limb, from the foot to above the knee, when that joint is affected, securing it properly upon the parts by fastenings passing over the shoulders, and keeping it moist by the frequent use of the diluted solution of subacetate of lead.

Sometimes an application of the kind prescribed below, to be used by washing the parts with it three or four times in the day, may be sufficient without the poultice:

Take of—Strong vinegar, half a pint,
Solution of subacetate of lead, two drachms,
Water, one pint and a half,
Spirit of camphor, one ounce; mix them for a wash, to be used as directed above.

The parts may afterwards be strengthened by the use of strong stimulant camphorated spirituous opiate washes, and rolling them well up with elastic bandages for some distance both above and below the joints.

Where great weakness still continues in the parts, the rubbing them with strong blistering liniments may be beneficial in restoring them to their perfect state and power of action.

In the case of the coffin joint being affected, blistering in a repeated manner, all round the coronet, with strong blisters, will probably afford the only means of effecting a cure.

In case the back-tendons or their sheaths are affected, when the complaints are in their first states, and there is considerable inflammation in the parts, it will be proper to remove it in the onset by fomenting them with bran and water, a little warm, or by the use of the bran poultice that has been directed above for some days, when, if the heat and tension be wholly removed, cold bracing washes, as directed below, may be employed:

Take of—Muriate of ammonia, one ounce and a half; dissolve it in

Vinegar, one pint and a half,

Solution of subacetate of lead, one drachm and a half; mix them for a wash, which may be used two or three times in the day, and an elastic bandage, moistened with the same liquid, be put moderately tight round the leg, being kept constantly wet.

Or, with a view of giving more stimulant action to the parts, they may be embrocated with spirit of camphor and ammonia, and the roller be kept wet with the same; and where there is still a deficiency of such action, rectified spirit with the powder of the blistering fly may be had recourse to, in the proportion of two scruples of the powder to one ounce of the spirit, which will produce a very mild blistering effect, the horse being so confined as to prevent any interruption to its operation. In this way the strength will in most cases be soon restored, and any puffiness that may have appeared will be dispersed.

The exercise during the whole of the cure should be gradual, and of the easy walking kind; but no sort of work should be attempted even for some time after the lameness is wholly cured, as there is a great disposition in such tendinous and ligamentous parts to become again diseased in the same way, as a great length of time is often necessary for the perfect restoration of the parts to that state of tone, strength, and firmness which they originally possessed.

In cases of the ruptured suspensor ligaments, where the horses break down, as there is an almost total incapability of confining the extremities in such a manner as to allow the ends of the broken ligaments to come into immediate contact with one another, so as that their reunion may readily take place, it is with very great difficulty, if at all, that a cure can be effected, the limbs scarcely ever recovering the natural positions of the fetlock parts. There is consequently a loss of much active power, and of course a depreciation of the value of the animal. The means which have been directed in the cases of strained tendons may be tried, keeping the legs as steady and fixed as possible during the time of their application.

STRING-HALT.

This is a sudden sort of twitching or catching up of one of the hind extremities to a higher degree than is usual and proper in the time of going on the roads. The nature and cause of this muscular affection are involved in much obscurity; but it, probably, may take place in consequence of the extending muscles of the legs having, to some extent, lost their power; and, on that account, becoming incapable of counterbalancing the action of those that bend the limbs when in the act of going, by which defect the suddenness in lifting up the leg is caused.

The remedy, in such cases, must depend on attempts to restore the power of the extensor muscle, by stimulating and blistering applications, topically employed, after the use of cold washes.

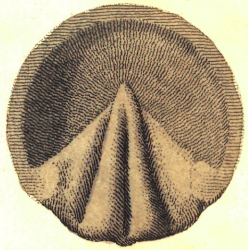
A..... *Sandcrack*.....
B..... *Windgall*.....
C..... *Splent* .....
D..... *Ringbone*.....

EXPLANATION,

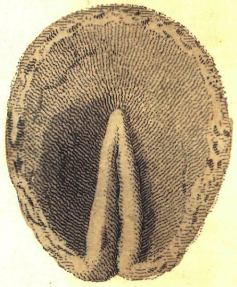
shewing the diseases of the Legs of Horses.

E..... *Curb*.....
F..... *Bone spavin*.....
G..... *Blood spavin* ....
H..... *Capp'd Hock*.....

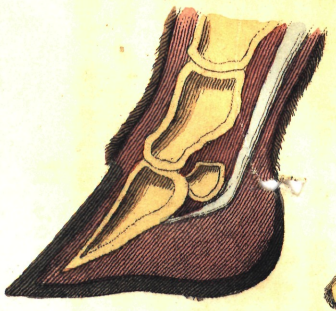
Perfect Foot.

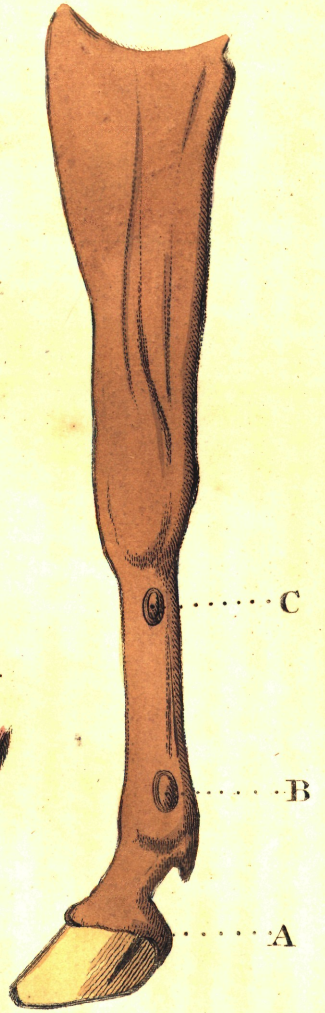


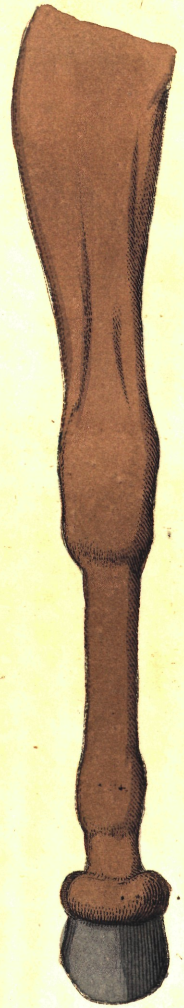
Contracted Foot.

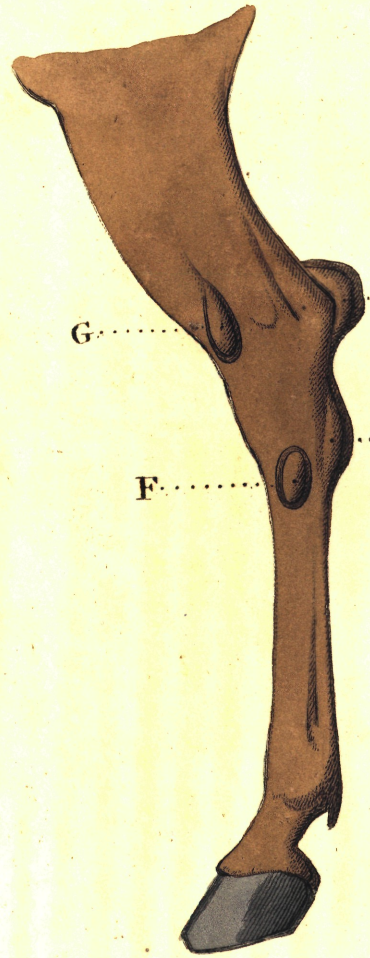


Section of the Foot.

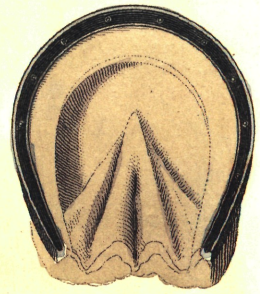




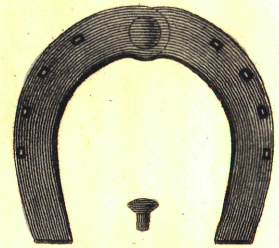




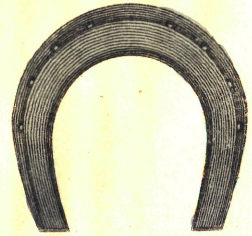
Clip, or Patent Shoe.



Hinge, or Pivot Shoe.



Hunting-horse Shoe.



London Published by Thos Kelly, *17, Paternoster Row, July 12, 1823.*

BLOOD SPAVIN.

This is an affection of the vein of the thigh as it passes over the bend of the hock joint; but which rarely happens, and still seldomer causes much injury, except in the little deformity it occasions, and is frequently mistaken for the bog spavin. When it does occur, it mostly arises in consequence of over-straining and exertion, or from bruises or other local injuries on the parts, causing weakness and relaxation.

It appears in the form of a small soft dilatation, swelling, or enlargement, of the thigh vein in that part where it runs over the inside of the hock joint; being readily distinguished by its giving way, and disappearing, in some measure, on pressure below it, and returning again on its removal.

The cure, in such cases, should always be first attempted by the frequent use of strong astringent washes applied to the parts, and supporting them by proper bandages kept constantly wet with the washes, in the view of removing the relaxation and local debility. When, however, such means fail in their effects, it has sometimes been the practice, to cut down upon the enlarged vein, and to pass ligatures round it, both above and below the affected part, which, being tied, the intervening enlargement is digested and thrown off, and the complaint, by these means removed; but in this way, the inconvenience of the remedy is often greater than the disease, until the circulation of the blood in the part be properly restored by the lateral branches of the vein becoming sufficiently enlarged.

A far less troublesome and more expeditious method of proceeding will be, to apply blisters, or strong blistering fly ointment, to the part, every fortnight or thereabouts, compressing it well afterwards by means of a properly-folded cloth, wetted with such a liquid as that directed below, which should be kept constantly on it, in that state, by a long suitable bandage:

Take of—Muriate of ammonia, one ounce and a half; dissolve it in
Vinegar, one pint and a half,
Solution of subacetate of lead, two drachms,
Rain water, one pint,
Spirit of camphor, two ounces; mix them and make a wash for the above use.

Moderate exertion should only be used by the horses, in these cases, for some time after the cure has been affected.

BOG SPAVIN.

This is a more frequent disease than the above, but which proceeds from much the same causes, and affects horses in much the same manner.

In this disease there is an inflammation, which causes an encysted swelling or enlargement of the capsules, bursæ mucosæ, or the membraneous bags that contain and afford the synovia that lubricates the joints at the upper and inner side of the hock, which, by forcing out the vein that there runs over it, produces a sort of distention, which has sometimes led to the supposition, that the complaint has its existence in the vein itself, but which is not the case.

In the cure, where there is considerable inflammation, the use of fomentations and cold discutient poultices will be necessary in the beginning; after which, the application of repeated blisters may remove the disease in some cases. But if matter be collected, proper means of opening the whole must be taken, and the cysts with their contents be sloughed away, by the use of dressings moistened with oil of turpentine and similar matters, and escharotic substances, such as dried alum and sulphate of copper, should occasionally be put to the parts.

THOROUGH PIN.

In this case, a soft elastic swelling or fulness appears on the two opposite sides of the hock-joint at the same time, being suspected to pass through the whole joint whence probably the name arises. The mucous bags on the different sides of the joint being affected and causing the swellings.

It takes place in consequence of some particular weakness or relaxation in the ligament which surrounds the joint, and the fulness in which, when pressed by the finger, gives way and is lost, but directly returns on withdrawing it. There is rarely much lameness produced by it, though it shews that the joint has been distressed and injured by too much straining and exertion.

As the means of cure, blistering, with rest, are the most to be depended upon; the use of the blistering fly, in fine powder, mixed with pure spirit, as already directed, will probably be the most proper for the purpose. But other means, such as are directed in the preceding disease, may be occasionally had recourse to with great benefit in many cases of this sort.

WINDGALLS.

These are diseases of a similar nature to those described above, and which commonly proceed from some kind of long-continued over exertion, such as the strains arising from too heavy work, or too much travelling: putting the horses to hard work at too early an age; the allowing them to stand too much on uneven paved floors, by which the fetlock joints are kept too much on the stretch, when they should be in the state of rest and relaxation, in consequence of their rising positions; and also from a natural debility of the system, or from the local weakness of the parts in which the disorders are seated.

They usually appear in a sort of small puffy swellings or enlargements, immediately above the fetlock joints, or near such parts, which have often been falsely supposed to contain nothing but air; they are mostly, however, affections of the capsules or mucous bags, which are placed between the different tendons and other parts, in order to prevent friction and expedite motion, by the discharge of the lubricating fluid which they contain, and are caused by their taking on inflammation; and by an increase of the lubricating fluid. They frequently take place on each side of the back sinews, above the fetlocks on the fore legs, and very commonly on the hinder legs, and feel loose and detached. They are not, however, confined to these parts, but are sometimes met with in the hocks, near the knees, and in other places; existing, in most cases, without any sort of pain.

Where they arise on the hinder legs, they do not always cause lameness, but a sort of stiffness behind in going. When, however, they are seated on the fore legs, they constantly produce a lameness in going on the first attack; but which afterwards gradually wears off, though they continue to go stiff, and are disposed to trip and stumble. Flatulent puffy swellings of this nature, when they take place in the ligaments of the hock joints, are invariably troublesome, as well as awkward in their appearance, and cause incurable lameness, if not speedily removed. They are rarely of much largeness on the first attack; but in time become of the size of a small pear, and appear on the different sides of the hollows of the hocks.

Sometimes similar swellings shew themselves above the knees, previously to diseases of these joints taking place; and the very small ones that occasionally appear under the fore parts of

the knees, in the little hollows on the sides of such joints, are constantly to be suspected as of a bad quality.

Soft tumours and swellings of these kinds in young horses, may, in their early state, in most cases, be removed by proper rest, good keep, and such remedies as are described below, and which act topically in giving power to the parts, together with general strengthening internal medicines when necessary.

In slighter cases, washes of the cold, strong, astringent kind, may sometimes be sufficient to remove these complaints. But in all the more obstinate and inveterate cases of long standing, the only effectual means are those of firing, and the application of strong blisters or blistering matters afterwards. Sometimes such active blistering substances as that directed below will answer the purpose alone:

Take of—Oxymuriate of mercury, in powder, two scruples,
Blistering fly, in fine powder, two drachms and a half,
Olive oil, two ounces and a half,
Turpentine liniment, one ounce and a half; mix them into a liniment, to be applied as there may be a necessity.

After any of these means have been employed, the local weakness in the parts may be greatly relieved by the support of a proper elastic bandage put round the limbs, and kept constantly wet with cold vinegar, and the diluted solution of the subacetate of lead.

And the whole process of cure may be greatly assisted, by turning the horses out into good pastures, or such yards, if in the winter season, as are destined for keeping them in, the better sorts of keep being always allowed them.

CURBS.

These are diseases which usually take place in consequence of a protracted and excessive working in the labour of the field, or on the road, or from some sort of local injury done to the parts, either by bruises or some other such causes. There is generally a degree of lameness present, which is in proportion to the degree of inflammation of the parts, and which rarely gives way of its own accord. They are most common in young horses, especially in such as are what is called cow-houghed. They appear in the form of small swellings on the back part of the hock.

The diseases arise in consequence of strains in the sheaths, through which the tendons pass in their way down to be inserted in the feet, in which there is at first some state of inflammation produced.

In most cases, where they are not of too long standing, they may be removed by the free use of blisters, or strong blistering liniments, to the parts, and by properly supporting them; but where they are older and of the more inveterate cast, it will often be necessary to have recourse to absolute firing.

AFFECTIONS OF THE JOINTS AND BONES IN THE LEGS.

These affections are of various descriptions, arising in most cases from injuries that have been received externally, though, in particular instances, there may be internal causes operating at the same time. They are frequently very hurtful and tedious complaints, and require very careful attention and management for their prevention or removal.

STIFF JOINTS.

In these cases, the heads of the bones that form the joints are sometimes closely united by means of the ossific matter which in such circumstances is formed and thrown out from them. They most generally take place in consequence of some accidental injury done to the

joints by wounds, punctures, or some other such causes, which occasions the necessary lubricating fluid of such parts to discharge itself outwardly, when by the action of the air a considerable degree of irritation and inflammation is excited; and if such openings be not speedily closed, a thickening in the membranous substance of the joints is begun to be produced, and the heads of the bones afford an ossific material, that completely solders and unites them together, so that the use of the joint is ever afterwards wholly lost.

In the prevention of affections of this kind, it is evident that not the least delay should take place after the very first appearance of them. The point to be immediately attended to is the union and closing of the punctures or wounds that may have been made in the parts, so as to prevent the discharge of the synovia of the joint, by joining their surfaces and putting them in a state of healing; and the too usual practice of promoting this by the introduction of substances and dressings is therefore highly improper. The state of the parts and the disposition to heal, in these cases, are materially different to those in other circumstances, being much slower and more tedious in consequence of their less vascularity and their greater hardness, which demand something particular in the manner of producing their union. No sort of application of the poultice or other such kind, which tend to keep the parts open and disunited, should ever be used; but where there is much swelling and stiffness present, the neighbouring parts of such wounds may be fomented, as there may be a necessity, with rather hot bran and water and chamomile flowers, in order to remove them; and when merely the edges alone of the punctures or wounds may be just touched with some caustic substance once in two or three days, such as the nitrate of silver or the muriate of antimony. The best method of using the latter of which is, to apply it by means of a wooden skewer by just making the point of it wet with it, without letting any of it get into the wounds; the whole of their external surfaces being then closely covered with suitable dressings, so as to keep them as much as possible from the action of the surrounding air. In this manner these cases may generally be managed with safety and benefit, without having recourse to the use of the hot iron, as is the too usual practice, and the anchylosis or incurable stiffness of joints be thus often prevented.

OSSIFIED CARTILAGES IN THE FEET.

This disease sometimes takes place in these parts, and is productive of lameness in a considerable degree. It most frequently happens in the fore feet alone; and though it has a great resemblance to the ring-bone, it is materially different from it.

It usually takes place in those cartilages of the foot which have their situation immediately contiguous to the quarters, which become changed into a bony state in consequence of the deposit of ossific matter.

In the prevention or cure of the complaint, the use of blistering and the application of such substance as may promote the taking up of the bony deposit will be necessary, as well as firing in some cases; but from mistaking the real seat and nature of the disease, it is often neglected until it becomes wholly incurable.

SPLENTS OR BONY EXCRESCENCES.

These are diseased states of the bones to which all sorts of horses are liable, but there are some which are more disposed to the throwing them out than others; and in all cases young horses, particularly when they

have been brought into hard labour in their early growth, are the most subject to be attacked with them; though they sometimes wear away and disappear of themselves, being taken up by the natural absorbent action of the vessels of the parts. They rarely appear in aged horses, except in consequence of blows or other such accidents; and they are more frequently met with in the fore than the hind legs, perhaps from the weight and percussion being more thrown on them in travelling. The occasional lamenesses which are often unaccounted for in young horses are frequently of this sort, proceeding from the inflammation that attends them.

They usually shew themselves in the manner of small hard risings on the shank bones between the knee and the fetlock, but generally on the inner side at a small distance from the former, being rarely met with on the outer. They not unfrequently take place, too, under the suspending ligaments or tendons of the legs, so as to put them out of their situation to a greater or less degree in proportion to their size. They commonly happen in consequence of the inflamed state of the medium that connects the smaller bone of the leg with the larger, near to the knee joint; and are almost in every case preceded and accompanied with some degree of inflammation. While such a state of the parts is going on, the production and deposition of ossific matter in them become abundant, and consequently increased risings of the bony kind are thrown out, which, in such circumstances, are exquisitely sensible, and the cause of lameness from pain when the foot strikes the ground. This state continues until the coverings of such parts of the bones become properly distended and fitted to the enlargements in such cases; and it is in some measure increased when they happen underneath tendons or ligaments, by putting them slightly out of their places, and in that way hindering their natural action, until they become perfectly habituated and suited to the changes.

A lameness is not unfrequently to be noticed in the animals for some length of time before there are any evident signs of enlargement in the parts, which disappears as that advances. Sometimes also such enlargements shew themselves when the horses are not in the least inconvenienced by them. When they are seated in the middle parts of the shank bones, they are less painful and dangerous than when they are formed on the back parts of them; and when near the joints they are more productive of lameness than in other cases.

These complaints ought never to be disregarded on their first appearance, in the uncertain expectation or chance of their being removed by the natural absorbent action of the vessels of the parts, but should be attended to as soon as ever they are discovered to have taken place.

In most fresh cases there is commonly a thickening and enlargement of the membrane that covers the bone before the bone itself becomes affected; therefore the cure may at first be attempted by the use of cold vinegar, old verjuice, or solutions of strong and powerful astringent substances, which should be kept constantly wet on the parts, so as to remove or prevent their tendency to enlarge. In cases where any enlargement in the bone appears after clearing away the hair from the parts, they may be well rubbed over by means of a thin wooden knife proper for the purpose, with the ointment prescribed below, as there may be occasion:

Take of—Oxymuriate of mercury, in fine powder, half a drachm,

Blistering flies, in fine powder, two drachms and a half,

Strong mercurial ointment, one ounce and a half,

Oil of turpentine, half an ounce; mix them into an ointment for the above use.

Mild blisters, and such oily blistering mixed substances as that below, frequently succeed in a remarkable manner, when repeatedly applied and well rubbed in on a sufficient extent of surface about the parts affected:

Take of—Blistering flies, finely powdered, three drachms,

Camphor liniment, one ounce and a half,

Oil of origanum, two drachms; mix them into a thickish liniment, so as to be readily rubbed on the parts. The horse's head should be well secured during the whole of the time that these blistering remedies are in use.

When the blistering action is over, the parts may be dressed with some mild oily application; and when the irritation left by it has quite subsided, the part may be supported by a proper bandage put round it.

But when diseases of this sort have been of long standing, and are situated near to the knee joints, the firing iron becomes necessary, which must be first drawn in a slight manner over the parts in close lines, and then blisters or blistering substances should be applied to them.

The great object in all such cases is to promote the taking up of the bony matters by every possible means.

Bone spavins, or the small enlargements that take place a little below the hocks on the inner sides, have a similar origin and formation to those of the above kind, and the means of removing them are much the same; but unlike them, they usually attack and appear in the more aged horses, and generally continue to enlarge during the whole course of life. They are more to be apprehended where they rise from affections of the bones themselves, than where they are caused by kicks or blows. Where they affect the lower parts of the hocks, there is less to be feared than where they are higher, as in the intervals of the round protuberances of the leg bones. Those that are formed near the edges are likewise less injurious than such as take place more in the middle parts, the bending of the hocks being less affected. And they are always the most to be feared when put out in the more aged or very old horses, being in the latter case almost wholly incurable. The remedies recommended in the cases of splents will be found equally applicable on these occasions.

RING-BONES.

These diseases also have much similarity in their nature and causes to the preceding, and are most to be feared in the large-boned heavy-legged horses.

They are formed by the deposition of bony matter on the fore part of the pastern joint on the lesser bone of that name near to the coronet of the hoof. They generally first appear on the front of the coronet, and not unfrequently extend to the quarters. In many cases, they cover a large portion of the front parts of such joints. They are constantly less obstinate when they plainly shew themselves partly round the pastern, than when they spread downwards in the direction of the coronet; as in that case they are liable to affect the coffin-joint, unless they primarily arise from strains or other faults in it, in which circumstances there may be a callosity under the round ligament that covers it. They occasionally happen in both the fore and the hind legs.

When they form more externally, and affect the ligamentous parts that join the hoof and the fleshy substance, they are not without danger to such parts; but when they rise on the pastern and do not spread down to the

coronet, there is little difficulty or danger in them.

In the true cases of this sort, where there are bony hardnesses that have continued for some length of time in a perfectly indolent state without pain, firing in close lines, and afterwards repeated blistering, as in cases of splents, will be the most certain means of removing the complaints.

AFFECTIONS OF THE SKIN UNDER THE KNEES AND HOCKS, OR MALLENDERS AND SELLENDERS.

These are scurfy inflammatory diseases of the skin underneath or in the bends of the knees and hocks or houghs, produced in consequence of impeded perspiration arising from the want of proper cleaning and dressing; in which there are sometimes cracks that discharge a sharp thinnish fœtid matter. They are occasionally the cause of lameness and stiffness, as well as tripping and stumbling. When they take place on the hinder parts of the former of these joints, they are termed *mallenders;* and when on the fore surface of the latter, *sallenders;* but such distinctions are of little use in practice.

In the means of cure the same methods are practised in the different cases. These are by first clearing away the hair or not, as there may be occasion, and washing the parts well with soft soap and water, and then either applying plasters of strong mercurial ointment to them twice in the day, until the whole of the scabs disappear, or frequently using a solution of equal parts of sulphate of zinc and alum as a wash.

Some persons without any further trouble, after washing and cleaning the parts, make use of a mixture or ointment, as directed below, as a dressing to them once every day.

Take of—Sulphuric acid, one drachm and a half,
Oil of turpentine, ten drachms; mix them very gradually and slowly together, and add
Oil of rosemary, three drachms; make a mixture, to be applied once a day in a small quantity, by rubbing it upon the part.

In cases where the ointment is considered preferable, it may be prepared in the following manner:

Take of—Camphor, dissolved in spirit, three drachms,
Oil of origanum, one drachm and a half,
Ointment of spermaceti, two ounces,
Olive oil droppings, half an ounce,
Superacetate of lead, half a drachm; rub and mix them well together into a thin ointment, a little to be applied on the part as above, or more frequently when necessary.

When the inflammation is considerable, and the cases do not readily give way to such means as these, mild mercurial diuretic purgative medicines will often be found greatly beneficial in removing them.

BROKEN KNEES.

In these cases the skin is often the only part that is affected by the accidental injury, but occasionally it is of greater depth and becomes more formidable in its appearance.

In either case when severe, in the cure of such accidents, it will first be necessary that the parts be well cleaned of every extraneous substance; after which, a cold bran poultice, kept well moistened with the diluted solution of subacetate of lead, may be applied once or oftener in the day, for some days, so as to prevent the rising, or to keep down any tendency to inflammation that may take place. Then as soon as the wounded part assumes the healthy healing state, such applications may be laid aside, and a common digestive dressing be employed. Should any enlargement continue after the part is become healed, a mild blister may be applied over it, in order to promote its

being taken up by absorption, which will equally forward the growth of the hair over the wounded part.

But in slighter cases, when the parts have been carefully cleaned from all extraneous matters, the skin should only be evenly laid down over the parts, without any application of poultice or other such material, and secured in that situation until they get well, which will in most cases be soon completed without further trouble.

HARNESS AND SADDLE GALLS.

These are little tumours and swellings in the skin, produced by pressure and inflammation from different causes. They frequently arise from the unequal pressure of some parts of the geers, and also from different hard substances getting between them and the skin, particularly from the heat produced under the saddle, in consequence of travelling; from the uneasy situation of it on the backs of the horses, from its not fitting well; from dust, small stones, and gravel, introducing themselves between the saddles or girths and the skin; and from many other similar causes. It is, consequently, of much importance, in preventing complaints of this sort, to have the various kinds of trappings and saddles made so as to sit in an easy and perfect manner on the backs of the animals, and to avoid the removal of them in too speedy and careless a manner after hard labour or riding.

The tumors, in all such cases, are small in size, and of a lumpy feel, being seated in the skin, where there is the most pressure from such causes as have been stated.

These complaints are troublesome to cure, when not properly attended to at first, but when taken in time they are soon removed by proper means. In the more simple cases, the tumors commonly give way readily and become dispersed by such applications as are directed below:

Take of—Common salt, two ounces; dissolve it in
Boiling water, one pint and a half; when cold add,
Vinegar and brandy, of each two ounces,
Tincture of opium, half an ounce; mix them, and make a wash, with which the parts may be bathed two or three times in the day.

When the inflammation is higher, the following may be better:

Take of—Superacetate of lead, half a drachm,
Vinegar, half a pint,
Spirit of camphor, half an ounce; mix and make a wash, to be used as above.

In cases that are of longer standing, an embrocation of the kind described below, may be more advantageously employed in the same way:

Take of—Oil of turpentine, six drachms,
Compound soap liniment, one ounce,
Tincture of opium, three drachms; mix and make them into an embrocation.

In cases where the skin has been forced off the parts by friction, the sores may be dressed by a little of the compound tincture of benzoin, several times in the day, and be defended from the action of the air by a plaster of the proper kind.

Where, however, in any case, matter forms, it must be let out by means of a lancet, and afterwards be dressed in the usual manner.

Whenever tumors of this nature arise on the back bone, or near it, in consequence of too severe pressure on the parts by the harness, saddle-trees, or other such means, as they are generally attended with great pain and enflammation in and near them, and from their incysted quality, rarely give way to the methods that have been directed above, a discharge must be

produced from the skin by such substances as the following, and applied as necessary:

Take of—Oxymuriate of mercury, in fine powder, one drachm,
Blistering flies, finely powdered, six drachms,
Olive oil droppings, five ounces; mix them into a liniment; a little of which may be rubbed upon the part until it becomes blistered.

Such small tumors may sometimes be wholly dissected out, and the wounds healed in the usual manner.

SITFASTS, OR CALLOSITIES IN THE SKIN.

These affections are generally the consequence of such diseased states of the skin as the above; in which a particular callosity takes place in the parts, which by degrees separates from the others, and is sloughed or thrown off: but as this sloughing and disuniting is not unfrequently a slow and tedious process, it is proper, in many cases, to hasten it by the use of the knife. And when the skin has been destroyed, and is completely sloughed and cleared away, the part may be occasionally dressed with pledgets dipped in compound tincture of benzoin. In some cases, stimulating ointments or washes may answer the purpose of the knife.

ABRASIONS OF THE SKIN ON FORE BOWS, BRISKET, AND BETWEEN THE FORE LEGS.

When the skin is rubbed off in any of these parts by travelling, or in any other ways, accompanied with heat and swelling that cause an acrid discharge, producing a scalding soreness in the parts, great relief will be in most instances afforded, by first washing the parts well with a lather of soft soap and water a little warm, and then laying over the whole a folded linen cloth, well moistened and kept wet with diluted solution of subacetate of lead. In particular cases, a thickish diffusion of finely-powdered fuller's earth, in warm soft water, spread over the parts, will soon remove such complaints, by taking away the swelling and irritation that causes them. Such affections will, in numerous instances, be wholly prevented, by washing these parts carefully with soft soap and water just warm, when the horses come in from severe labour or travelling, without any other trouble whatever.

AFFECTIONS AND DISEASED STATES OF THE FEET.

These diseases and affections are of several different kinds and qualities, arising from the particular nature, structure, and functions, of the foot of the horse, and are greatly deserving of consideration, so as to ascertain the proper means of removing and remedying such injuries, defects, and states of disease, to which they are so particularly exposed and liable.

NARROW CONTRACTED HEELS.

This is a diseased state which is, in most cases, confined to the fore feet, in consequence of their nature, structure, and uses. The principal causes that tend to the production of it are, improper modes of shoeing; a natural tendency to dryness and hardness in the horny part of the hoof, with great strength and thickness of the wall part; long standing on dry litter, in narrow confined stables with ill-formed floorings that slant too much backwards; want of pressure, in not setting the foot down, in consequence of the lameness of some other part; too much labour or exercise at one time; and some other causes of the same nature.

The complaint is shewn to be present by the horse appearing to be in great pain; by the continued motion of the feet and legs, with a seeming desire to lie down, but without doing so; by the paces being very indistinctly per-

formed on first going out, in consequence of the weight giving pain by its pressure, from being thrown so greatly on the hinder legs; by the feet being but little raised above the surface of the roads, when the horse goes on the trot; by the steps being made very short; and by the usual pace being the walk, as giving the least pain.

As it is well ascertained, that when these contractions have continued for some length of time, a real cure is scarcely ever to be accomplished, the great importance of discovering the first inclination to them must be plain. Such states never happen suddenly, as the parts within the hoof do not directly give way to the compression from without, but when it is long continued, the internal parts are taken up and diminished, in some measure, in proportion to that of the outside part. And as one great original cause of such contractions is the unusual solidity and strength of the wall part of the hoof, it is clear, that it must be a very improper and hurtful mode of proceeding, to cut or pare the sole too thin, as by such means the amount of resistance that it provides, and which is proper for keeping up a regular state of action in every part of the foot, is lessened or destroyed. The strength of such parts, and the badness in the forms of the shoes, by their confining the heels, are also injurious, in causing corns and in other respects.

The endeavours to expand the hoofs in these states, which have been attempted in various ways, must, in general, fail, as in almost every case of such affections, the internal parts of the hoof, or the cartilages above them, have undergone some change in their structure, by the deposit of ossific matter or in other ways, so as to render them wholly incapable of being restored to their natural functions.

In almost all cases of this sort, which have not advanced too far in their contraction, so as to have caused great deviation in the natural forms of the parts, the progress of the disease may commonly be stopped, and the cure effected, by such means as those which are directed below. The shoes should, in the first place, be taken from the feet both before and behind, without suffering them to be confined, in any way, so that they may grow downward in their natural manner. After which, if they are capable of it, the hoofs, particularly at the heels, should be reduced quite thin, and to the same line with the lower parts of the frogs, the soles lessened, the toes shortened, and the parts situated between the bars and the crusts of the hoofs, hollowed out, rendering these last much more thin about the quarters by the rasp. In the next place, the parts all round the coronet, and quite up to the fetlock, where necessary, should be mildly blistered once or twice, after the hair has been removed, by rubbing them well with such a blistering application as prescribed below, so as not to blemish the skin or leave it in a hard state; but just to bring on an increase of action in the vessels of the parts, without carrying it too far, which would produce injury instead of benefit, and which is too often done by strong blistering and corroding substances.

Take of—Blistering flies, finely powdered, three drachms,
Petroleum, two ounces,
Olive oil, half an ounce, or as much as will make it into a thinnish liniment, proper for being rubbed on the parts The heads of the animals should be confined during the use of such blistering means, to prevent their rubbing the parts.

The horses may then be turned into proper soft pastures or yards, suitable for the purpose, where they should be kept for some length of time, until the contractions are cured.

In slight cases, and where there is a great want of moisture in the parts, much advantage

may be gained, by putting the feet into a vessel convenient for holding some warm fluid or other matter of a softening quality, filled so as quite to cover the hard horny parts of them, and keeping them in it every day for some considerable length of time, so as to remove their hardness, or tendency to become too dry.

When it is necessary to re-apply the shoes, they should be such as are made thinner at the heels than those which were formerly used, the heels of them being made to rest firmly upon the bars and crusts, or hard parts of the feet. And in cases where the disease has continued for a length of time, and the narrowing or contraction of the heels has proceeded to a great degree; after the horses have continued in the pastures for a sufficient time, and have had their heels lowered occasionally during their stay in them, so as to allow of their proper growth, and the gaining of their natural shape, they may be shod with such shoes as have very low thin heels, by which the frogs will be forced to have their natural and proper bearing on the ground.

But where the horses, in such states, cannot be turned out into pastures, they should be allowed plenty of stable-room, the bottom parts of which should be well laid over with some moist earthy material of the clayey kind, and be constantly kept in the same damp state by the occasional application of water, so as to serve the same purpose as the soft treading on the sward in the pastures, over which it may sometimes have a superiority for such purposes.

Although these modes may often be effectual in restoring the natural form of the feet, the necessary and proper actions of them are much more difficult and troublesome to be recovered; as they frequently undergo so much alteration in their conformation, in consequence of the length of time the inflammatory state in them continues, that their capability of distending themselves, or spreading out, is almost, if not wholly, lost. This is often the case in the cartilaginous parts about the upper and under divisions of the feet, which, taking on a sort of bony nature, often become almost, if not quite, incapable of having their actions restored in any effectual manner, and the feet, of course, will be in the same state. The only remedy is, proper shoeing with bur shoes, so that they may rest on all the different outside or horny parts, without in any way affecting the frogs of the feet.

ROUNDED OR PUMIED SOLE.

This is a state quite contrary to that in the above cases; and which is occasionally the consequence of inflammation or fever in the feet, but which more frequently arises from a natural thinness in the wall of the hoof, and from bad shoeing, as well as some other causes.

In these cases, the walls of the hoofs are commonly so thin and weak, that the weight of the body alone resting on them is sufficient to hinder their increase: in consequence of which, the generation of new horny substances is slow, and thrown forward towards the points of the toes, which are usually greatly and improperly lengthened. The fore part of the foot, also, in place of keeping the regular straight line to the ground, falls in, in some degree, in the middle part, causing a set of horny risings to project one over the other; and from the state of the heels, the sole descends, the weight falling upon the latter instead of the former. Any increase of pressure on the quarters, in these cases, by hollow shoes, or any other means, must, therefore tend to increase the disease.

In all cases of this sort, where they have arisen from inflammation, and where there is a

sunk state of the coffin bones, any attempt at the cure of the complaint will be quite useless; but where the affection has proceeded from improper shoeing, it may generally be either wholly or partially remedied. The chief means of effecting which is, by displacing the shoes, and turning the horse in that state to grass, which, by throwing the weight and pressure wholly upon the sole and frog, the quarters are left in a state to grow downwards to their full extent, by which means the proper condition of the foot may be restored. But in addition to such means, mild blistering may be applied to the coronets, and the toe parts may be shortened repeatedly, as much as can be done, without the heels being in the least touched. The horses should be kept in the pastures, in the unshod state, for a sufficient length of time, as half a year or more, until the proper effect be produced.

THRUSH, OR AFFECTION OF THE SENSIBLE FROG.

This is a painful disease of this part of the foot, that takes place from various causes, as inflammation, contraction of the heels, want of cleanness in the parts, bad shoeing, and some others. In case the frog be diseased, it is termed a running thrush, and it may happen in consequence of the want of pressure on that part, from its being by some means prevented from touching the ground, or from the inflammatory tendency being increased in it by standing too much on stale litter in the stall: as when it has not sufficient pressure upon it, it becomes in a soft state, on account of the collected fluid, which is so abundantly secreted by it, and which at last escapes at the cleft of the parts, and becomes an acrid disagreeable discharge, that injures the contiguous parts, rendering the whole so sore and painful, that the animal becomes unsafe in going on hard roads.

The presence of the complaint is shewn by the horse discovering pain and tenderness upon the frog part being pressed, and when frequently a very fetid discharge issues from the part.

In all cases of this nature, the shoes should first be displaced, and the heels be lowered by paring them down repeatedly, so that the frogs may come freely in contact with the ground, in which state they may continue for some time. After which all the diseased parts may be pared away, cleared, and well washed with warm water, in which soft soap has been dissolved, being then dressed with the substances as prescribed below.

As it is better not to restrain the discharge in too sudden a manner, lest an increase of inflammation, with lameness, should be the consequence, and the running be renewed in a more violent degree, the use of oil of turpentine and strong spirit may be had recourse to in the beginning, and then the following ointment may be spread thinly upon lint or tow, and applied to the diseased part in the division of the frog daily:

Take of—Sulphate of zinc, three drachms,
Dried alum, two drachms; rub them fine with a little
Olive oil, and then add,
Common tar one ounce; mix them into an ointment, to be used as above.

In these cases the frog should be carefully preserved from wet and moisture, as they tend to increase the disease, but keeping the hoof parts in a moist state is very beneficial.

CANKER, OR AFFECTION OF THE SOLE.

Any of the feet of the horse may be affected with this disease, but the hind more frequently

than the fore, probably in consequence of their having less weight and pressure upon them, and therefore affording less resistance to its progress. The long continuance of the thrush, from its nature and effects, has a great tendency to produce this complaint, as the discharge from the division of the frog, by destroying the hardness, and at the same time the functions of the part, increases the contracting cause of it, until the whole of the frog becomes destroyed, which diseased action extending and insinuating itself between the horny and fleshy soles, renders the former soft and rotten, and the foot becomes in the state of canker. The grease, also, may, probably, in some cases, assist in producing the disease, by the matter passing down upon the frog, and keeping it in a moist soft state, so as in time to render it unfit for its destined functions; in which case, contraction and its effects are induced, which ultimately terminate in this disease.

When allowed to proceed to too great a length, the disease is mostly incurable, as in such instances the capability for producing a new horny sole is destroyed with the sensible secreting sole, and the coffin-bone laid bare.

In effecting a cure, where it is possible, the whole of the affected soft parts, with that portion of the hoof which is detached from those within, must, in the first place, be cut away, when all the diseased surface may be dressed with pledgets spread thinly with the liniment directed below; and secured by a proper degree of pressure, which is greatly favourable. They should be renewed daily, so that any fresh fungous substance that may arise, may be removed by being cut away.

Take of—Sulphuric acid, two drachms,
Oil of turpentine, ten drachms; put them slowly together, and add gradually,
Common tar, one ounce and a half, so as to make a soft liniment for the above use.

Some persons think it better to touch the surface of such parts with the muriate of antimony, and then to put over it a dressing of dry tow, covered over with lime, in the state of fine powder, repeating the dressings daily, until the whole is rendered quite clear of the foul soft matters, and acquires the fine red healthy aspect, when the treatment may be the same as in ordinary wounds, keeping down any fleshy risings that may appear, by the use of verdigris or nitric oxyd of mercury in very fine powder.

CORNS, OR AFFECTIONS OF THE SENSIBLE SOLE.

These are the consequence of inflammation of this part of the foot, mostly near the heel and inner quarter. They are usually caused by bad shoeing and irregular pressure arising in other ways; such horses as have naturally flat feet, with soles that are rather thin, being the most subject to them.

Corns discover themselves by the lameness of the horses on their being first taken from the stable; by the great and unusual heat of the feet on their being touched; and by much pain and uneasiness being shewn after removing the shoes by pressing on the parts.

In the feet of horses these affections are accompanied with a degree of softness which permits blood to be thrown out between the horny fibres of the part, which gives it a brownish red appearance, and renders it very tender and painful. And when the inflammation is not counteracted or restrained, it runs on to the formation of matter, which either insinuates itself between the different layers of the hoof and the foot, so as to make its escape at the coronet, or, in consequence of its acrid and corrosive quality, it destroys the horny sole, and lets itself out at the bottom of the foot.

In the slighter cases of this sort, the cure

may sometimes be effected by merely taking off the shoes and then paring away the parts which are the seats of the disease; but in the more inveterate and severe states of the complaints, the diseased parts must be wholly cut out by a proper knife, so as to leave a proper space unacted upon, and must be properly dressed with pledgets dipped in a mixture of compound tincture of benzoin and myrrh, or common tar and oil of turpentine. The feet should, for a short time at first, be kept in bran or linseed meal poultices, and constantly renewed; and all sorts of pressure afterwards should be prevented by a proper shoe so applied to the part which is opposed to that which is the seat of the disease, as to answer that purpose. Much care is necessary in cutting out the diseased parts to guard against injury to the hoof in any way. The feet should likewise be daily stopped with some such substance as the following:

Take of—Common tar, one ounce,
Oil of turpentine, half an ounce,
Elder ointment, one ounce and a half; mix them into an ointment for the above purpose.

When corns are attendant on contracted feet, the only certain means of removing the disease is by unshoeing, as the equal and regular pressure thus produced on every part of them, though at first it may render the pain more severe, will at last cause the part where the corn was to become more hard, and reduce it to the state of the rest of the hoof part of the foot.

In the re-application of the shoes when again necessary, it will be proper to have the sole parts of them formed in as hollow a manner as they will allow, from the quarters to the heels, taking care that they sit in a firm way on the bars, and crust towards the extreme parts of the heels.

SAND-CRACKS, OR CLEFTS IN THE HOOFS.

These are affections that take place most frequently in such horses as have strong brittle hoofs, or narrow contracted heels. They are mostly found on the sides of the crust towards the heels.

They consist in a partial separation of the fibres of the horny or wall part of the hoof, beginning at the coronet and passing half way down in a direct line. When they proceed from the coronet, they are very troublesome.

In cases where the disease has gone to any considerable extent, lameness is produced, and great length of time is then necessary in completing the cure. In consequence of that part of the hoof where the cracks take place being in a dead state, they are wholly incapable of forming an union at their edges, so that it becomes necessary to cut them away quite down to the quick, when they may be dressed with a portion of tow dipped in tar, and secured by proper bandages. Some persons, however, thin the parts well about the cracks by the rasp, and then, in order to prevent their extention, apply the firing iron both above and below them to the full distance of the fissures, by drawing it over in a gentle gradual manner, likewise conveying it over the cracks themselves, by which inflammation and a small quantity of moisture is produced, which have the effect of filling and uniting them. The whole should be kept covered with tow spread with the ointment prescribed below, and secured on the part by proper bindings:

Take of—Common turpentine, ten drachms,
Elder ointment, half an ounce,
Lard, two ounces; mix them into an ointment for the above purpose.

A blister applied round the coronet is often found of great use in these cases.

When the cracks extend down to the bottom

of the feet, bar shoes should be put on, so as to take off the pressure from the heels and prevent the springing of the quarters, and should be fitted in such a manner as that they may rest with firmness on the frogs, the parts of them in the crust that come opposite to the seats of the disease, being dished or hollowed out, so that they will give no sort of pressure there.

Too great dryness of the crust being, in some degree, the cause of the disease, moisture is evidently, in some measure, necessary, both in the prevention and cure of the complaint; and in these intentions, such parts of the feet should be constantly kept moist, either in the stable or by turning the horse into a moist pasture, as soon as the diseased parts have undergone the above preparation.

QUITTORS, OR SINUOUS ULCERS IN THE FEET.

These are diseases which commonly arise from some hurt done to the coronet, running in sinuses downwards under the crusts of the feet; they are attended with severe pain, inflammation, and lameness, and, when neglected, produce great injury. They mostly arise in consequence of treads, bruises, or pricks, in shoeing, made on or near the parts which are the seats of the complaints; and sometimes from gravel, which, by working its way upwards, lodges about the coronets. In some cases they proceed from injuries done to the sensible soles, in which the discharges of matter are made at the coronets, where there is the least resistance. Bad cases of the above kind, too, occasionally terminate in diseases of this sort, or ulcers in the coronets of the hoofs, which, when neglected, often cause carious or diseased states of the bones and cartilages of the feet.

The ulcers, in these cases, are formed in a sinuous manner, between the hair and hoofs of the feet, near the cartilages of them, and in various other directions.

The removal of the more superficial cases of this kind may generally be effected by mild, proper, cleaning, and escharotic applications, such as the nitric oxyd of mercury, in fine powder, and by daily bathing the parts about the coronets well with a mixture of proof spirit and tincture of opium, the sores being occasionally washed with strong lime water, or some other detergent wash.

But where the sinuous ulcerations are of greater depth, or when there are collections of matter formed in the hoofs, and more interior parts, there will be much more difficulty and trouble in their removal. In all such cases, it will first be necessary to examine and ascertain the nature and direction of the ulcers, so as to get at the bottom of them, where it can be done, and without cutting away large portions of the crusts, as is too often the case, by forcing and introducing into them such fine escharotic substances of proper strength, as may stimulate and induce them to take on the healing process, and become perfectly sound. In this way the cure may be accomplished without leaving an eschar blemish or local weakness in the parts, which are not only disagreeable, but lasting. The preparation advised for this purpose is as follows:

Take of—Nitric oxyd of mercury, in fine powder, one drachm and a half,

Oxymuriate of mercury, finely powdered, two drachms; rub them well with

Venice turpentine, as much as may be sufficient to form a soft pasty substance, which is to be occasionally introduced into the sinuses, in such quantities as may be proper and necessary, the wounds being afterwards dressed with some common digestive, spread on lint or tow, suitable pressure being given by proper bandages passed round the coronets.

Some persons make use of tents, formed of proper materials, spread with some greasy sub-

stance, over which is thinly sprinkled oxymuriate of mercury, in fine powder, and rolled up into as fine and thin rolls as possible; and then forced up into the sinuses as far as they will go. They are left there for several days, until the proper sloughing and healing effects are produced, the heads of the horses being properly secured; they are then taken out, and the parts afterwards readily heal, simply by keeping them clean and free from the action of the external air.

Where the cartilages of the feet, however, are actually diseased, it will be necessary to remove the parts affected, by cutting them away, before the healing process can possibly take place. And in many cases of such collections of matter, they cannot be reached in any other way than by the removal of some portion of the hoofs. Where the matter, by its confinement and corrosive quality, has produced injury or destruction of the soft spongy substance of the coffin-bones, which are readily disposed to become carious, it will often be necessary to make the openings large, take away the spongy parts, and apply the point of the hot iron, afterwards using dressings of lint dipped in a mixture of tincture of myrrh and compound tincture of benzoin, to the bared parts of the bone, covering the wounds with pledgets spread with ointment mixed with nitric oxyd of mercury.

Where the ulcers are not enlarged by such openings, which is the best practice in most cases, the oxymuriate of mercury alone, in fine powder, is often applied; or the sulphate of copper, in the same state, with a few drops of the sulphuric acid; and these remedies are considered equally powerful in their effects in the same intention, as well as less painful in its action on the horses.

During the operation of these caustic substances, it will be generally proper to keep the feet of the horses constantly enclosed in poultices of the bran or linseed meal kind.

Where deformity is left by the growth, in one side of the indented part of the hoof, rising higher than the other, and what is called a false quarter produced, it is no otherwise detrimental than in the appearance.

LOCAL DEFECTS AND INJURIES.

There are several states of local defects and injuries in the horse which deserve consideration, in consequence of their various disadvantages and hurtful tendencies. The principal and most usual of these are the following:

DISEASED RESPIRATION, OR RORING.

This is a common affection in the horse, and consists in a noise of a peculiar kind, which takes place in the breathing whilst in quick motion. The origin and seat of the disease has been attributed by some to the lungs; but by others, with more reason, to some sort of obstruction in the upper part of the trachea or windpipe, in consequence of coagulable lymph having been thrown out during a state of inflammation in that part, and causing a thickening of its surface to be formed. Horses affected in this way cannot by any means be considered as sound. The usual method of attempting to discover it is, by giving the animal a sharp stroke on the loins or under the belly with a switch or whip, and turning it round in a quick manner at the same instant; when, if the horse makes a kind of groaning noise at the time, it is considered a proof of its being in that state. The noisy effect is evidently caused, in this case, by the quick contraction of the muscles of the belly, forcing out the breath contained in the lungs through the trachea with too great a rapidity, on account of the impression made

on the animal by the switch or whip, and, in some measure, in consequence of a slight degree of bending being given to the ribs in the action of turning so shortly round.

The disease, in its appearances, has sometimes, in the beginning, a whistling, but which, when it reaches a more fully-formed state, the breathing becomes deep and loud. It is not impossible but that the mouth, or opening of the trachea, may on some occasions be hurt by improperly pinching, in order to ascertain, by the nature of the coughing, thus produced, whether horses be sound in their wind.

The cases where the affection is confirmed, should always be well distinguished from those which are occasioned from causes that only act for a time, as frequently noises are made in the breathing, where there is an affection of the cold or strangle kind in the animals.

In these affections there is mostly a continual declining in the condition of the horses, for though they will eat their food in the full quantities, and with the same apparent appetites as in other cases, it has not the same effect in nourishing them, as they are rarely able to do much work of any kind whatever.

The effects of strong mercurial ointment might be tried in these cases with a probability of success, by applying it freely and frequently about the top of the windpipe, if the seat of the complaint be ascertained to be there.

STATE OR CONDITION OF CRIB-BITING.

This is a state which is so termed in consequence of the habit which some horses acquire of biting the manger, and is attended with a convulsive action of the higher parts of the wind-pipe or trachea. It is supposed that the animal, in this action, sucks in and receives air into the stomach; but it is difficult to conceive how this can be the case, as the air, from its perfectly elastic nature, must in all cases be forced to that part where there is the least resistance; and that as the mouth of the horse continues in the open state whilst breathing or sucking in air, it must be the consequence of the upper parts of the throat contracting in the state of swallowing, that the air must, of course, be propelled back again into the mouth and not into the gullet, which is constantly close and in the collapsed state, except at the moment when food or water is passing. It is impossible that air or any sort of fluid matter whatever can be sucked or drawn into the mouth, except sufficient space be given for it by means of the lungs drawing in that which was before contained in it, in the operation of breathing. In cases of this sort, therefore, whatever air may be drawn into the mouth, by the habit of sucking or crib-biting, must necessarily pass into the lungs, by being drawn in by their instant full expansion.

It is well known, that horses in this state usually have their bowels greatly distended with wind; but this may arise from imperfect digestion, as during the action of crib-biting there is a large quantity of the digestive fluid escaping at the mouth, and a considerable loss of a fluid sustained, which is indispensable in the process of digestion. It has been supposed by some, that this state of the animal is nothing more than a case of the spasm kind acting on the muscular parts about the top of the throat, in consequence of some sort of similar action with those of the jaws. The affection has hitherto been considered incurable, and renders the horses unsound. There is a practice of putting a strap round the higher part of the necks of horses that have this habit, with the intention of preventing the motion of the windpipe, but the effect produced by it must

be very trifling, if any. There is, perhaps, no effectual remedy for this very injurious habit in horses.

WOLF TEETH.

This name is given to a large coarse tooth coming out on each side in the upper jaw, so as to cause much uneasiness in eating. They mostly arise about the third year of the horse's age, on each side, near to the grinding teeth, and are a sort of tusks. They are injurious to the thriving of the animal by the pain they occasion, which prevents the proper chewing of the food, and causes much of it to be swallowed in the whole state. On these accounts such accidental false teeth should constantly be drawn and removed from the mouths of horses, which may easily be done by a proper instrument, as they are loosely placed in their situations; but they should not be harshly knocked out, as they sometimes are, by means of a sort of iron bar and a hammer, a practice equally injurious and cruel.

BREAK OR RUPTURE.

Cases of this sort arise from the fleshy covering parts of the belly giving way on some account, so as to admit some portion of the bowels or other part to come through the same, and push out the external skin in a lumpy manner. These affections or accidents may take place in any part of the belly, but they more commonly happen in two, as the navel and the scrotum, but much more frequently in the former. The most common causes of rupture are bad strains, or the being injured by stakes, gored by the horns of animals, violent kicks from other horses, breaking the pastures; but some others may occur occasionally, by which the confining parts of the bowels on the belly may be ruptured without doing injury to the skin, on which a lump equal in size to the part broken arises. This disorder may take place also in consequence of the intemperate habits of those who have the care of such horses, by kicking them severely on the belly parts, especially when the shoes are weighty and shod with iron.

In every case of this nature, while in the incipient state, a suitable bandage should be made use of, so as to support and prevent the bowels from forcing through the parts that have given way; and something of the plaster or other close sticking kind might be put upon the parts, with much advantage. These are the best means in fresh ruptures, as when they have been long formed, very little benefit can be expected from any application.

SUBSTANCES OF THE FLESHY OR WEN KIND.

These are lumpy risings that frequently come out upon the more loose skinny parts of the body. The cause from which they proceed is not easily explained. They usually begin in the parts of the skin where the vessels are the more minute, which, by gradually enlarging, in time become of much magnitude and have a fleshy feel. They rarely occasion any pain, in consequence of their very small beginnings and the slowness of their growth, being in some cases of many years' continuance before they are of any great dimensions. They increase and become ultimately in the state of the natural fleshy matter, and are seldom attended with any very bad consequences, except the awkward appearance of the parts, or the weight and pressure upon them. The substance of them is often of the loose fleshy quality, and generally of a spongy tendency; but in some cases they are partly spongy and partly of a hard schirrous nature, particularly when they arise in the glandular parts.

Where wens take their rise from tendinous and other such parts, and no part of them is in any way connected with their fibres, the part, when examined, has the appearance of many little threads combined together, which is in some measure the case in their schirrous state. When a wen arises immediately from the fatty membrane where that substance is deposited, it has a collection of greasy material which has the resemblance of suet; and sometimes a small portion of clear coloured fluid is in it. These pendulous cases of wens, which are most generally inclosed in a sort of cysts or little bags that include the whole materials that are formed, and which become enlarged in the same degree as the contained matters are increased, is the reason why such sort of enlargements are not capable of being cured without the destruction of the cysts or bags at the same time. These tumours rarely rise to much largeness on horses before they are removed by proper means; the first of which is to disperse them by the use of strong embrocations of various kinds; and where these are not successful, caustic is used, but sometimes the knife, as being the most certain, expeditious, and effectual mode of removing them, is resorted to.

BITES AND STINGS OF REPTILE AND OTHER ANIMALS.

Where proper care and attention are bestowed on the instant of the accident in cases of the bites of adders and vipers, the parts may be immediately relieved and a cure be effected by the use of such means as below:

Take of—Olive oil, five ounces,

Solution of subcarbonate of ammonia, one ounce; mix them well together for use as follows:—the parts which are bitten, or more extensively when it is required, should be kept well rubbed with the oily mixture, as above directed, for some length of time, and several times in the day when necessary.

In some cases, however, the embrocation, as given underneath, is considered more powerful and effectual in arresting the effects and advance of the poisonous matter; and is equally useful for the stings of wasps, bees, and hornets:

Take of—Olive oil, six ounces,

Solution of ammonia, one ounce and a half,

Spirit of camphor, and

Tincture of opium, of each two ounces and a half; form them into a mixture for use as directed below.

It should be well embrocated on the part once or oftener in the course of the day as required.

When internal febrile remedies are requisite, the following may be used:

Take of—Nitrate of potass, one ounce and a half,

Subcarbonate of potass, six drachms,

Gruel, made thin, one pint and a half; mix and dissolve the whole, which is to be given while just warm.

In case an opening remedy be necessary, castor oil will be the best, and may be given in the quantity of from eight to ten ounces, by mixing it with warm gruel.

CANKEROUS STATE OF THE TEETH.

This disease takes place in the grinding parts of the teeth, and is mostly occasioned by the rusty state of the bridle, as is readily pointed out by a sort of little black, blotchy, or brownish spotty state which is displayed on the tongue or some other part of the animal's mouth. Or it may arise from improper keep, and other causes, when it has a white small specky appearance, spreading much and causing irregular little ulcers to arise over most part of the mouth.

The best means of cure in the first state of this disease is to have the affected grinding teeth struck out by the punch, as being the most effectual. In the latter, the mixture, as below, may be used with effect:

Take of—Subborate of soda, half an ounce,
Dried alum, one ounce,
Common salt, six drachms; dissolve them in
Strong vinegar, eight ounces; mix them well together for use as directed underneath.

The horse's mouth should be well washed and cleaned out twice in the day with the mixture, and a proper contrivance of the flexible rod kind, of sufficient length, to which, at one end, should be fixed a piece of sponge or some kind of soft material. The animal should not be permitted to eat for some time after the washing has been performed.

WOUNDS.

Wounds in horses arise from various causes; but they principally take place in consequence of the application of some sharp cutting, hard, blunt bruising, small puncturing, or other similar instruments or bodies, to the more soft parts, which produce solutions of their continuity. Wounds of course vary in their nature and circumstances, according to the kind of instrument or body with which they have been inflicted.

On the first infliction of every wound, there is commonly a greater or less degree of bloody discharge taking place, from the soft or other parts which may have been divided, to which generally succeed pain and tension, in proportion to the extent of the mischief which has been done to them, and which require to be properly attended to, and restrained when necessary.

The danger of wounds, in general, will be in proportion to the nature and size of the vessels which are injured or divided, and the importance that such injured parts are of to life. Of course, the nearer any wound is to a vital part, the more dangerous it will be. Wounds which penetrate into the cavities of joints are never healed without considerable difficulty; and the same is the case with all those which are situated near to or in any part which has a continual motion, such as the lungs, belly, or other similar parts. The dividing of the principal artery of a limb is often the cause of mortification in it; and that of a principal nerve, of insensibility and wasting. The division of a tendon mostly destroys the whole of the motion that depends on the muscle which is in connexion with it. Such wounds as are made into the spinal marrow commonly produce death, or the mortification of the lower parts. And deep wounds, where the suppuration is extensive, sometimes produce a hectic disposition in the animals, in consequence of the great absorption of matter which takes place. Wounds are likewise rendered more or less dangerous in consequence of the circumstances of fever being more or less present, or in higher or lower degrees of violence.

The circumstances which are necessary to be more particularly attended to, in first examining the nature of wounds, have been already considered and partly explained in speaking of such accidents in neat cattle, as well as the processes or methods of healing wounds; but they may be here again just noticed as being of two kinds; one of which is that of the union of the divided parts by means of *adhesion*, the other that of *suppuration*.

In the former, the junction of the separated parts is effected in a simple manner, without any matter being formed. It is, of course, the most desirable mode, in most cases, and may not unfrequently be accomplished in wounds of the cut kind, by bringing the parts into immediate contact, and keeping them securely in that situation by proper means, without any further trouble.

In the latter, the union of the parts is accomplished in a more elaborate way, by a fluid

being thrown out from the vessels of the divided part, which is converted into the state of pus or matter; in connexion with which new granulations of flesh begin to be formed, and continue to increase until the whole surface of the wound is rendered even, and a covering of skin takes place over the whole of it. This is a mode which occurs where the destruction of the soft parts has been so great by the inflammation, or other means, as to prevent the healing from taking place in the former manner.

The general methods of managing fresh wounds are those of stopping the bleeding where necessary, in the first place; which is accomplished either simply by means of pressure, or in a more troublesome manner, in cases where large blood vessels are either punctured partially, or wholly divided, by the use of ligatures or the tying them up; and where any such vessels are only largely pricked into, or partially cut through, they should almost constantly be completely divided, if possible, either by dilating the parts, or other methods; then, in all cases where the sides or parts of the wounds are capable of being brought into exact contact with each other, it should instantly be done, they being confined and kept in that position by sticking-plaster, bandages, or such other suitable means as the nature of the parts will allow.

The use of these easy means will, for the most part, unite and heal all sorts of simple wounds from cutting instruments in a very short time.

However, in all such wounds as arise from contusion or laceration, a different sort of management is to be had recourse to. The diminution and removal of the inflammation is here first to be attended to, by promoting and encouraging suppuration or the formation of purulent matter in the parts; as this constantly abates, in all such wounds as are healed by means of granulations of new flesh, as soon as good matter is found in the wound. And where the mischief is very considerable, it will frequently be necessary to guard against the accession of fever, by taking away blood and having recourse to nitrated laxative mashes, and at the same time applying such substances to the part as may relax as well as preserve a suitable degree of warmth for the production of matter. This last intention is probably most fully promoted by the combination of heat with moisture, in the forms of saturnine or other fomentations and poultices. When suppuration has fully taken place, the management which is necessary must be directed by the extent of the wound, the nature of its situation, the appearances which it puts on, and some other circumstances, as seen in the different sorts of wounds that are noticed below, and which are here more fully considered than they were under the different former such heads.

WOUNDS OF THE SUPERFICIAL OR COMMON KIND.

Under this head are comprehended all wounds which arise from cutting instruments, or other bodies, whatever their nature may be, and the principal difference of which consists in their size and the nature of the parts in which they are situated. When not very extensive, they are capable of being united and healed by simply drawing the separated parts together and preserving them in that position until the cure is completed. But when they are of considerable extent, they can seldom be cured in any other way than by means of the suppurative process. The former method should, however, be tried in all cases of these kinds.

In doing which, when there are many ex-

traneous matters, the parts should first be cleaned by the use of a soft sponge and warm water; and then be brought together into exact contact with each other, being retained securely in that situation either by ligatures, or by the application of long narrow strips of sticking-plaster, put across the lips of the wound in a tight manner. And where the nature of the parts will allow of it, a roller should constantly be passed round them, and kept wet with a wash prepared by means of the solution of superacetate or extract of lead and soft water.

In cases where little swelling or inflammation takes place in wounds of these kinds, the above applications may remain on the parts for two, three, or four days, or more. And if any small portion of such wounds should not be united, but remain unhealed, pieces of lint, made wet with the tincture of myrrh or other such tincture, should be applied to it, lying strips of sticking-plaster over them, which will complete the cure.

But in large wounds which cannot be healed in this way, after extracting and removing any extraneous bodies that may be in them, restraining the flow of blood as much as possible, taking away the morbid swelling and tension in the parts, and bringing the sides of the wounds fully over them, they should have pledgets of soft lint applied to them, over which may be laid a large one of tow, or some other similar material, spread with some sort of simple ointment, sufficient to cover the whole; which should be kept upon the parts by suitable bandages, and be frequently moistened as above. The first dressings, in these cases, usually continue upon the parts for several days before they are removed, and sometimes until the discharge of matter renders their separation perfectly easy and convenient. On the removal of the first dressings, the others may succeed every twelve or twenty-four hours, according as the discharge is more or less acrid or abundant. When afterwards there is a necessity for promoting suppuration or the formation of matter in the parts, resin cerate, to which a little oil of turpentine or other similar substance has been added, may be made use of by being spread upon the lint. The dressings may commonly be applied in their natural state, or a very little warmed. As often as the surfaces of the wounds are cleaned, it should be done by just touching them with small portions of soft lint in a gentle manner, and not by roughly wiping them over, which injures or destroys the tender granulations of new flesh by which the wounds are to be filled up and healed. The surfaces of the wounds should also constantly be kept in somewhat a wet state, instead of being rendered perfectly dry, as the digestive process is thereby less interrupted and the healing considerably promoted.

In both cases of healing wounds of this kind, where granulations of new flesh take place, either so as to rise above the ordinary surface of the skin, or by their fungous nature to impede the process of healing, they may, in the former state, be first touched on the edges or other parts with some sort of escharotic material, such as nitrate of silver or lunar caustic, sulphate of copper or blue vitriol; or have a little red precipitate or nitric oxide of mercury rubbed down, and applied to them once or oftener in the course of the day; and in the latter, they may be repressed by the application of dry tow or lint to them, with a suitable compress laid upon such matters. By these means, (the whole of the other dressings or applications being refrained from,) the wounds will soon be healed.

It, however, occasionally happens that the healing of wounds is retarded and prevented by other causes, such as the loose flabby, or weak relaxed state of the parts about them; in the first of which situations, they may, therefore, be done over at every time of dressing them, either with a mixture of lime water and tincture of myrrh, or a weak solution of the oxymuriate of mercury, or corrosive sublimate; and in the last, have the parts well supported by narrow slips of sticking-plaster drawn tightly across them, and by the use of proper bandages. These means, where the habit of the horse is naturally sound and good, will commonly assist the speedy healing of wounds of these kinds. Sometimes, when the wounds have been filled up with flesh in the above manner, it may be useful to have their surfaces done over with the powder of prepared calamine, or other similar powdery matters, in order to accelerate the skinning process.

There is a difference in wounds of this nature, caused by their being seated in particular parts, and sometimes in consequence of the organs, which are indued with certain actions and powers, being wounded or partially hurt, as, in such cases, appearances are often put on which are very dissimilar from each other.

Where there are wounds of the legs which are of the common kind, the practice which has been directed above may generally be had recourse to with success; but where there is the division of a tendon, a greater length of time will commonly be necessary, in order to unite and heal the parts; as in addition to their being brought into exact contact with each other, it will be essential that the tendon be kept in a relaxed state by means of a proper position. With this view, a shoe is sometimes had recourse to, which is formed in a thick manner at the heel, so as to preserve the leg in such a situation as may obviate any improper extension of the injured tendon. Over the whole of the injured part of the leg a long elastic roller should be slightly passed, and be constantly kept wet by a wash of the saturnine kind. Where tendons are wounded, swelling and inflammation mostly take place, but not in a sudden manner, the former usually coming on and proceeding gradually with the latter. It has been usual, in these cases, to have recourse to spirituous applications of the turpentine and other similar kinds, but a better practice is that of putting the affected limb into the easiest position in the above manner, keeping the wounded part free from exposure to the air, and applying, instead of such means, after the wound has been covered with suitable portions of lint, warm mild poultices, or, in some instances, cloths wet with a mixture of equal quantities of warm brandy and vinegar. Where inflammation appears to be coming on, or is actually present, mild discutient fomentations may be employed previously to the application of the poultices; or, when practicable, the injured part may be soaked in warm water, or any other fluid.

As soon as the inflammation and swelling have subsided and been removed, a discharge of matter will take place, in many cases, from the wounds, which should be dressed with pieces of lint made wet with the tincture of myrrh or the compound tincture of benzoin; upon which should be laid a compress of some sort, kept tight on the parts to preserve them in their proper state. All applications of a greasy nature should be carefully avoided, merely having recourse to the above, until such time as the wounds are completely filled up by the new granulations of flesh. Afterwards, these granulations, where necessary, should be restrained and kept down sufficiently, by such

escarotic substances, as described above, so as to promote and complete the process of skinning over or healing.

It has been supposed, that great benefit in the healing of these sorts of wounds, attends the restraining of the animals from the use of water. And it is contended, that in bad cases of this nature, in post horses, the only chance of a perfect cure is the keeping them from water; and further, that cases which have been quite despaired of have been completely cured, by the absolute prohibition of water until the wounds discharged good matter. Where large quantities of proud flesh take place on such wounds, fomentations of hot beef brine have been used, four or five times a day, with complete and rapid success.

When the wounds have been completely cured, where the legs remain weak or swelled, much advantage may frequently be derived from the use of the saponaceous liniment, or an embrocation composed of camphor, olive oil, and spirits of turpentine, the parts being well bathed with them two or three times in the course of the day. And where any superficial enlargement or thickening continues afterwards about the parts, they may in most cases, be reduced or dispersed, by inducing a slight discharge near them, by means of a mild blister, or in any other way. After which all such horses should, if possible, be indulged with a run, for some months, in a salt marsh, or good grass pasture.

Where wounds of this kind affect nerves, or parts in which they prevail, they are frequently attended with very alarming appearances, which take place according to the state of tension in the parts to which they are attached, and that of the peculiar irritability of the body of the animal at the time.

In cases where the pain is extremely acute, it is sometimes only by the complete division of the nerves that any effectual relief can be afforded. But in all other cases the applications should always, at first, be of such a nature as to allay the pain and irritation; and in some instances to promote the formation of good matter. The former of these intentions will be answered by portions of lint dipped in tincture of opium, or other similar kinds, and applied to the parts; while the latter may be accomplished by the use of similar pledgets thinly spread with some mild digestive substance. Some wounds of this sort are readily shown by the sharpness and corrosion of their discharges.

WOUNDS OF THE CONTUSED KIND.

These are all those which proceed from any sort of bruising body or substance; and chiefly differ according to the nature and weight of them, and the peculiarity of the part in which the wounds are situated. In some cases the mischief is very trifling; while in others it is very considerable. They most frequently occur on the knees and other parts of the legs, from falls, and the striking of them against each other in travelling; but sometimes, in other places, from blows and contusions received in many ways.

When on the knees, where the injuries are only very slight, not extending any further than the skin, they may commonly be united and healed, simply in the adhesive method, by first washing and cleaning the parts, and then placing them in proper contact with each other; after which they should be well bathed and wetted with the traumatic balsam or tincture, and have a flannel roller passed round from below to keep them securely in their places.

But where the contusions are of more considerable extent, and the wounds penetrate to

a greater depth than the skin, as through the whole of the soft parts, and sometimes even farther; it will constantly be necessary, after first cleaning them from all extraneous matters, to endeavour to prevent inflammation, or to lessen it when present, by the use of proper fomentations or poultices, such as those of the softening discutient kind, made with the diluted solution of superacetate or extract of lead, applied a little warm two or three times in the day. After some days, when there is no appearance of any inflammation, these applications may be discontinued, and the wounds should be dressed, once or oftener in the day, with pledgets of lint made wet with the above tinctures, having previously been well cleaned by washing them over with a mixture of vinegar and water a little warm. Over these pieces of lint, coverings of tow, or any other similar material, spread thinly with proper ointment or cerate, may be applied, keeping them on by passing proper bandages round the legs from below. Or, in some cases, the pledgets may be spread on the parts in a similar way. Where small collections of matter or abscesses are formed underneath the skin on the sides of the wounds, or in other places, such wounds should be laid open, in order to prevent the matter from lodging, and thereby retarding the cure.

During the process of healing, in wounds of this nature, the new-formed granulations of flesh not unfrequently rise above the level of the surrounding surface of the parts; these should, therefore, be always kept down by the use of some sort of escharotic material, such as sulphate of copper or blue vitriol, in fine powder, or the red precipitate or nitric oxide of mercury, which may be sprinkled over them in a thin even manner, pressure being given at the same time, by means of a suitable compress and a roller.

When the over proportion of new flesh has been wholly destroyed and taken away, every sort of dressing may be discontinued, keeping the parts perfectly clean, and the surfaces of them occasionally just touched with the sulphate of copper, or blue vitriol or some such caustic substance.

Whenever any sort of enlargement happens to continue afterwards in the parts, and about the knee joints in particular, strong discutient saponaceous embrocations, with suitable exercise or work, should first be tried for some little time; and where they are not effectual, mild blisters may be had recourse to. But when neither of these methods answer the purpose, a hot iron or cautery may be made use of, though not without great caution, and after the other modes have been fairly and fully tried.

In every case of this kind, where the mischief is to any considerable extent, it is proper, to take away blood from the animal, to the quantity of three pints or more, where strong and in full condition, and to have recourse to cold bran mashes through the day, with additions of saltpetre to them in the evening, allowing plenty of stable-room and clean straw, placing the hay fotherings in such a manner in the different racks or other places, as to make the animals move about in getting at them, and thereby affording them some degree of exercise.

When the limbs become capable of partially bearing the weight of and supporting the animals, they may have a little exercise given them every day, by being walked out for a very short time, which may be regulated as it is thought proper.

It will be also beneficial, under such confine-

ment, to administer a ball composed somewhat in the manner directed below every five or six days:

Take of—Camphor, in powder, two drachms and a half,
Submuriate of mercury, or
Calomel, half a drachm,
Nitrate of potass, or
Saltpetre, half an ounce,
Hard white soap, six drachms,
Yellow resin, in powder, six drachms,
Copaiba, as much as is sufficient to make a ball.

This medicine keeps them in a cool state, and prevents any swelling in the legs from taking place.

In these methods of management, most cases of this nature may be cured, without any great difficulty, or inconvenience to the animals afterwards, even in those where great injury has been done to the tendons of the knees by cuts, and the joints partially laid open and exposed.

WOUNDS OF THE PUNCTURED KIND.

These comprehend all those which are made by any kind of sharp-pointed bodies, such as nails, thorns, and other substances of the pricking sort; and differ considerably in consequence of the nature of the parts or cavities in which they take place, or into which they penetrate. Wounds of this description are, for the most part, attended with great pain and irritation, which are not unfrequently succeeded by swelling and inflammation in the parts. They have rarely any disposition to close up firmly, and to unite or heal, but the inflammation goes on, attended with a thin sanious discharge from the openings in the wounded parts. In all cases of this nature, there is constantly a degree of danger in proportion to the nature, utility, and importance, of the cavities into which they open or penetrate.

Where wounds of this kind merely take place in some of the soft parts of the body, there need seldom be any thing more done, than simply to remove the hair from the parts which surround the openings of the wounds, and then apply over them proper pieces of lint made wet with the traumatic balsam, or tincture, properly securing them by narrow slips of leather, spread with sticking-plaster, tightly drawn over them in somewhat a cross manner. After this, all the neighbouring parts about the wounds should be well rubbed over and soaked with a strong camphorated spirituous embrocation, to which a little tincture of opium may be added with great advantage. This may take place twice or oftener in the course of the day, and will lessen the violence of the irritation and inflammation.

Where the wounds are on the sides of the bodies of the animals, the inflammations and swellings which first take place will frequently disappear from them, and fall down upon the more depending parts; from which they may, in most instances, be either completely removed or greatly alleviated, by the proper use of setons or rowels placed in the most suitable parts of their bellies. In this way the cure of the wounds is often very much assisted and promoted. And where wounds penetrate into the cavities of the breast or belly, as is sometimes the case, one or more of the viscera, or internal parts of them are not unfrequently injured. Their penetration in these ways is ascertained by the use of the probe, and the nature of the discharges which are made from them shews, in some measure, the mischief which is done to such internal organs. Where the appearances which attend wounds that penetrate into the cavity of the breast or belly, are of the mild and favourable kind, and where there is no dis-

charge from any of such internal visceral parts, it may in general be safely concluded, that they are without any injury; in which situation, after excluding any air from getting into the cavities, they may be managed somewhat in the manner of simple common wounds.

But where any of the viscera have been protruded without sustaining injury, they should constantly be returned and restored to their situations as speedily as possible; and if wounded, sutures of the glovers kind be made use of to bring the parts together and keep them in that position, three or four inches of the ligatures of each being left hanging out of the wounds. And where these protruded internal parts have been exposed to the air, it may occasionally be necessary, previously to their being returned into their positions, to foment them with warm milk and water, thin starch, or some other material of a similar nature. The flannel bandage is the most proper, in all such cases, on account of its great elasticity, which fits it to the breathing of the animals.

All wounds into the principal internal blood-vessels are generally considered as mortal; but it not unfrequently happens, that blood is thrown out from the smaller vessels into the cavities of the breast and the belly. When it occurs in the former, it commonly occasions great oppression and difficulty of breathing in the animals. In order that the blood may be evacuated, in cases where the wound is in the lower part of the breast, the lungs may be pushed away and held back by means of a suitable probe, so that the grumous fluid may pass out and be removed; but when in the upper part of the same cavity, it may often be necessary to make an opening at the most depending point, with the view of promoting the immediate discharge of the same sort of fluid, suffering the original wound to close up. Any attempt of this sort, however, will be wholly useless, until such time as the flow of blood has stopped, which may, in some measure, be ascertained, by the force of the circulation, the equality of the pulsations, and the warmth of the extreme parts of the animals. After such openings are made, the matter will, however, be assisted greatly in its expulsion by the efforts and action of the muscles in respiration. The animals, in all such cases, should be kept perfectly still and quiet, and the use of opium, in some form or other, will frequently be necessary, especially wherever a cough is present.

In cases where blood is poured into the cavity of the belly, there are mostly laborious breathing, great anxiety, and an intermitting state of the pulse, speedily taking place, with sometimes other appearances of a similar kind. Where the discharge of blood, in these instances, is only small, the animals not unfrequently recover and do well; but where it is to any considerable extent, it for the most part proves fatal to them. The management here is much the same as in the former case, having proper regard to the different nature of the situation. The great and main objects are, the speedy evacuation and discharge of the bloody offending matter, and the exclusion of the external air as much as possible from the wounded part.

Wounds which penetrate into the chest or belly may sometimes be advantageously managed, by cauterizing their lips or sides with a properly hot iron, and repeating it as often as there may be occasion, in the manner which is directed for wounds that penetrate into the joints.

All such wounds as penetrate into the cavities of the joints, especially those of the larger kind, are almost constantly of a dangerous

nature, in whatever way they may have been produced, as whether by sharp cutting bodies or heavy ones falling upon them; for though the wounds may appear only small, the effects will often be very serious from the irritation that takes place, from the admission of external air, from the injury that may be done to the ligamentous parts, from the loss of their lubricating fluid or synovia, and from other similar causes. A great deal will always depend upon the state of body in which the animal is at the time of the accident.

Improper management in cases of this sort not unfrequently terminates in a fatal manner to the animals, or produces an incurable lameness in them.

In all wounds that penetrate into the joints, the principal consequences which are to be guarded against and avoided are those of pain or irritation and inflammation. The former is to be attempted by the use of opiates and the proper position of the parts. Those situations in which the joints are the most relaxed are the best and most suitable for the purpose. The latter may be accomplished by proper bleeding, and by having recourse to the necessary debilitating means. Where there is no swelling or tension taking place in the parts, it will be wholly unnecessary to have recourse to any applications of the emollient kind; but where such appearances are present, or begin to shew themselves, remedies of that sort should be instantly applied. There is also occasionally fever occurring, attended with a discharge that speedily reduces the animals in a great degree.

Wherever, therefore, injuries of this nature are of any considerable magnitude, and in connexion with any of the larger joints, especially if any degree of fever be present, it will be proper to take away blood in proportion to the strength of the animal, as from one to two, or even three quarts at a time, repeating the bleeding as there may be occasion, and sometimes to combine with it the use of purging medicines. After which, recourse should be had, as there may be a necessity, to a powder composed in the following manner:

Take of—Antimonial powder, and of
Hard opium, in powder, each half a drachm,
Camphor, reduced into a fine powder, two drachms,
Nitrate of potass, in powder, one ounce,
Snake root, in powder, one drachm and a half; mix and make them into a powder.

This powder may be given once or oftener in the course of the day, in a little warm gruel or mash, until the fever begins to be removed.

In such cases, the practice is sometimes to close the wounds by means of a hot iron, or the actual cautery being drawn over their surfaces in such a manner as to cause a discharge of glutinous matter, that may so unite the parts as to prevent the escape of the lubricating material from the joints. The iron employed for this purpose should have a peculiarity of form, being about two feet in length, terminating at one end in a sort of rounded knob about the size of a small button, the other having a wooden handle. There is likewise a peculiar state of heat necessary to be given it, which is that of a moderate red heat; as a black heat will not be sufficient to produce a suitable discharge of lymph for closing up the wounds; while that of a white one may destroy too much of the surrounding parts, and possibly do some injury to the ligaments. And farther, much nicety is required in its application; for though it is perfectly simple in its nature, the operation cannot be properly performed without a competent knowledge of the structure and uses of the parts.

As the main object here is to bring on a

supply of glutinous matter to close up the cavities, and before the sloughs come off, for granulations below to supply the place of the lymph, where the ligaments themselves are destroyed by the use of the cautery or hot iron, they must, as in all other cases where there is a loss of life in the parts, slough away and be separated from those which are living; by which means the joints will constantly be left open and exposed. It is of course very material in the application of this power not to suffer it to destroy the ligaments of the joints, by confining it alone to the more soft parts. Where, in such cases, the whole of the external surfaces of the wounds have been well cauterised, and the discharge does not instantly cease, the application may have been made to too trifling a depth, or with too cold an iron, to afford a suitable discharge of glutinous matter. These means will, however, generally close up the cavities and put an end to the discharges wherever there is any probability of the cures being accomplished in this way. Notwithstanding, occasionally, in the course of a few days, as from one to three, the discharges of the lymphy fluid will again take place on the sides, when it will again be necessary to have recourse to the same application as before. It has indeed sometimes been used five or six times, and ultimately succeeded without causing any lameness afterwards.

The wounds in these cases, after the use of the cautery or hot iron, should be laid over with portions of lint made wet with the tincture of opium, which may be secured by long flannel rollers being loosely passed round the legs or other parts, and kept constantly in a moist state by means of a solution of two parts of muriate of soda or sal ammoniac and one of superacetate or sugar of lead, in one part of vinegar and two of water.

In consequence of such management, the inflammation, for the most part, disappears in the course of a few days, and the dangerous appearances, which too often shew themselves when they are treated in other ways, are prevented from taking place.

In wounds which arise from the puncture of thorns, small splinters, or other pointed vegetable substances, especially when they penetrate ligamentous or tendonous parts, there is frequently considerable danger, as pain and inflammation speedily take place. Besides these parts, they often occur to the knees and hocks, or pasterns, *&c.* It is always a good practice where these or other parts are suspected of having received injuries of this kind, to wash them well with soap and water, and to examine them well by the hand in every direction, as in this way much mischief may often be prevented.

Where tendons or ligaments are wounded and injured in this way, a similar method of management to that which has been directed in the cases of punctured wounds, may be had recourse to with great success, by constantly guarding well against the effects of inflammation.

But as thorns and other sharp pointed vegetable bodies, not unfrequently remain lodged in the soft covering parts of the bodies of these animals for some time, until they are found to be there by the horses becoming lame, and great heat, pain, and swelling being present in the parts; in such cases it will be necessary to proceed in a different manner. Here a poultice, prepared by means of bread, or linseed meal, water, and the solution of subacetate or extract of lead, applied in a warm state, will be the most appropriate application; as tending either to induce a moderate state of suppuration and abscesses in the parts, by the

bursting and opening of which the thorns or other offending materials may be thrown out and got rid of; or by wholly dispelling and taking away the pain and tumefaction, such matters may be conveniently taken out and removed. The method of management which will afterwards be proper in such instances is much the same as that which has been already advised for ordinary cases of punctured wounds.

Wounds frequently occur from the pricks of nails in the shoeing of both horses and oxen, which, where they are not properly attended to, often become very troublesome; but when well managed, are extremely easy in their removal.

In these cases, it first becomes necessary to open down quite to the part which is pricked, and then to apply pieces of lint to it, wet with the tincture of opium or oil of turpentine, or a mixture of both, covering them, as well as the whole foot, where necessary, with some coarse sack-cloth, in order to prevent the intrusion of any dirt or other hurtful matter.

But in cases where there are formations of matter occurring before the injuries become evident, the parts will require to be laid open the whole length of the mischiefs; and the wounds must be managed by the use of some caustic liquid in the quantity of a few drops, as those of a solution of the oxymuriate of mercury or sublimate, or the muriate of antimony, or the butter of antimony, small pledgets of lint wet with traumatic balsam or the tincture of myrrh being laid over them. The whole should be covered with a large plaster of tow, over which the sack-cloth is constantly to be drawn if there be any occasion for it. The dressings, wet with the above solutions and tinctures, should be every day renewed; and in case the wounds have not the appearance of healing, they may have a little of the fine powder of red precipitate, or the nitric oxide of mercury, or any other similar escharotic, applied thinly over them, which will generally accomplish the business in an effectual manner.

In all cases of this sort the great object is either wholly to prevent inflammation from taking place, or discharge matter where it is formed; as by such means, suppurations, the affections of the bones, and much danger may often be avoided.

Great advantage may sometimes be derived from putting the whole foot into a turnip poultice, or soft poultice of any other kind.

Where the lameness is not removed on such openings being made, but bloody stinking discharges succeed, something still remains to be extracted by a more complete opening of the parts.

As the parts are sometimes tender after the wounds have been healed, they may be rendered more hard by stuffing or filling the feet of the animals with a substance composed of tar, hog's lard, and bole, or any other material of a similar nature, using them in a warm state on tow, and securing them in a proper manner upon the parts. The same sort of wounds occurring in any of the neighbouring parts, require a similar method of management.

WOUNDS OF THE GUNSHOT KIND.

These include all those which take place from any sort of fire arms, and chiefly differ in regard to the size, the nature, use, and importance, of the parts in which they are situated, and the directions which the bullets or other matters may take in such parts. They partake in some measure of the double nature of contused and punctured wounds, being often attended with irritation, pain, and danger.

Where the balls or other bodies have not passed through the parts, the first consideration should be that of extracting these extraneous substances from the wounded parts in which they may have been lodged, and of restraining any flow of blood that may take place. In order to effect the former, it is frequently necessary to enlarge the wounds either by means of the knife or by dilation, but the first is always the best mode where it can be safely practised, and then to take out such matters by the bullet forceps. Or, if they can be clearly felt at some distance under the skin, though at some depth, they may sometimes be cut down upon with safety, and be taken out in that way without much difficulty.

Occasionally where the balls or other matters have gone quite through the parts, when it can be performed with safety, the wounds in them should be laid fully open in their whole length, as by such means any extraneous bodies which may be present, may not only be more readily taken away, but the healing of the wounds will be considerably expedited. Great caution is, however, to be used in all such cases.

But though matters of these kinds may be cut down upon and readily removed as above, when at no great depth from the surface; where they sink deep and are quite beyond the reach of the finger, much injury and mischief may be done by searching for them and attempting to extract them by the use of long probes and forceps of the toothed or other sorts, as they bruise, irritate, and inflame the parts very greatly. Besides, there is sometimes much danger and harm from the latter laying hold of blood vessels, nerves, and other similar parts, in connexion with such bodies, which can scarcely be avoided. And where such substances are lodged in the cavities of the breast or belly, such attempts are equally injurious and hurtful; and they are by no means absolutely necessary, as in a variety of instances such matters are known to have inoffensively remained, for great lengths of time, in different parts of the bodies of animals, and in others to have wrought their way towards the surface, and been taken out from it afterwards. The only thing which is necessary on many occasions, therefore, is merely the healing of the external wound.

In getting at these matters, as little probing as possible is constantly to be employed, as every attempt of this nature adds fresh injury by the irritation which it occasions. The finger, where it can be used, is always the best and safest probe; but where it cannot, a bougie may be had recourse to for the purpose with great propriety. The latter of the above intentions, or that of stopping the blood, may be accomplished by wholly dividing the wounded arteries, or by tying them in some cases; but in others nothing at all will be necessary to be done, as the bleeding will soon cease of itself.

Such wounds as are made by bullets or pistol shots, and are but small in their nature, may in general be managed in some of the above methods. But where they happen near to joints, or in very membranous and tendonous parts, the use of the knife, as well as the forceps, must often be greatly restricted, no more of opening being suffered than what is just necessary for the free discharge of the matter contained in them.

In most wounds of this sort, the dressings at first should be simply that of dry lint, or the same substance made wet with a little tincture of opium; over which should be laid warm poultices, composed of the crumbs of bread, some kind of meal, or other suitable materials, made up with water and the solution of subacetate, or extract of lead. These soften and

relax the parts, and gently promote the suppuration or formation of matter in them, where such intentions are necessary.

As soon as the inflammations and swellings begin to disappear, the use of poultices, where they have been had recourse to, may be laid aside, merely washing the wounds over with a mixture of warm vinegar and water. The applications or dressings should now consist of lint, made moist by a mixture of equal proportions of traumatic balsam, or tincture of myrrh and opium, applied once or oftener in the day, according to the nature of the discharge. After the dead parts have completely sloughed away, such wounds will only stand in need of the ordinary management, of keeping them clean, and promoting the growth of new granulations of flesh in them, by means of lint spread with some digestive substance and laid to them, which may be kept tight and in their places by a suitable compress and roller, when the nature of the parts will allow of their being used.

In general, where the wounded animals have lost no great quantity of blood, a vein may be opened, and sometimes the bleedings be repeated with much propriety, as early evacuations of this nature produce many benefits, especially where the injuries are of considerable extent; they prevent or diminish the pain and inflammation in a great degree, lessen or take away any feverish dispositions that may be present, promote digestion, obviate the forming of collections of matter, and hinder a variety of other circumstances from taking place, which often greatly harrass and endanger the animals. Even in cases where the feverish state is high, and there are almost evident appearances of the formation of matter, bleeding will sometimes be of great utility.

In all cases, where injuries of this kind are liable to affect the health of the animals, it will be necessary to have recourse to the same sort of general management, as that which has been advised for wounds of the punctured sort.

But where the ends of the bones of any of the large joints, or any of the large bones of the extremities, have been broken by such accidents, it will in general be the best policy to destroy the animals, as they seldom can be cured so as to render them useful.

In these kinds of cases, no sort of unctuous or greasy applications should ever be made use of; those of the oil of turpentine description, with the tinctures already noticed, being by much the most proper, as causing the least rising of proud flesh, as well as being the safest and most effectual. Where there is much of this sort of flesh, lint dipped in solutions of sulphate of copper, or blue vitriol, or other similar substances, are the most proper applications. But fine powders of the escharotic kind may sometimes be used with equal or more benefit.

The diet of the animals should be such articles as are of the more light kind, such as scalded or wetbran, weak mashes, water gruel, and light fodder.

WOUNDS OF THE BURNT AND SCALDED KINDS,

These are all those which proceed from any sort of burning or scalding bodies, such as fires, ignited gunpowder, heated lead, burning oil, and other similar matters; and from boiling water, wort, and many other liquid materials in the same state. The principal difference, in cases of this nature, arises from the peculiarity and importance of the parts in which they occur, and the circumstance of the skin being left quite entire and unbroken, or wholly scorched up, broken, and destroyed. What has usually been supposed the fire left in the parts after accidents of this nature, is nothing more than

the irritation and inflammation which are constantly produced by causes of this description.

The great and leading object, in all such instances, is always that of abating and taking away the irritation and inflammation, by such means as soothe and dispel them, without producing too much pain and uneasiness in the affected parts.

In most cases of this kind, where the skin remains in its perfect and entire state, the cure may generally be readily accomplished by bathing and keeping the parts well soaked with the spirit of camphor, æther, and other volatile spirituous applications, by means of rags dipped in and made quite wet with them. Common salt, secured thickly upon the parts, and many other substances, have also been resorted to in the same state with very considerable advantage. Spirituous and saline applications are, indeed, superior to all others in this situation of the skin.

But where the external skin is separated and broken, it will be necessary to preserve the parts continually in as soft and gentle a state as possible, by the use of such emollient applications as produce suppleness in them. There are many which have this effect, such as oils of the salad and linseed kinds, cream, with a little of the solution of subacetate or extract of lead, and plasters spread with bees'-wax and oil melted together.

Where, from the scorched or other states of the skin, it is requisite that sloughs be thrown off, the parts should first be dressed with mild digestive applications, and the oil of turpentine, and the healing of the wounds should be finished by drying cerate plasters.

When the inflammation is considerable, and the animal is in full keep and condition, bleeding and the use of cooling clysters are highly beneficial.

WOUNDS OF LONG STANDING, OR THE ULCER KIND.

These are all those solutions of continuity, or losses of substance, in the fleshy parts, which are of long continuance, and which do not heal in the regular manner of ordinary wounds. They are, for the most part, in some measure connected with the internal state of the body, and the particular disposition of the system in the animal at the time. But though ulcers may be supposed to proceed in general from some morbid or vitiated state of the habit, all common wounds or sores may be considered as ulcers, when they contract or take on a degenerate or ill disposition, whether it be acquired from an internal or external cause.

Some distinguish ulcers into two classes or divisions, as those of the simple and compound kind; the former comprising all those which are mere wounds, capable of being healed and restored by the powers of nature, without much assistance from art; and the latter, all such as are of a more compound and complex nature, and which require considerable art and assistance in the curing and healing of them.

SIMPLE ULCERS.

These are all such as are of a superficial nature, in respect to their situations, and which are accompanied with foulness, and with hard or uneven edges, which are often raised above the surface of the skin which surrounds them. It has now been ascertained, by much experience, that ulcers of this kind, in the skin, are not in general attended with much difficulty in their cure; but that as their edges not unfrequently extend themselves above the surrounding surface, as just noticed, and get callous, they require, in such circumstances, some length of time to properly unite and heal them.

In cases of this sort, where the ulcers are

deficient in filling up, after removing the callous or hardened edges, by the use of nitrate of silver, or lunar caustic, nitric oxide of mercury, weak solutions of sulphate of copper, or blue vitriol, oxymuriate of mercury, or sublimate in water, or some other application of a similar nature; the whole should be dressed with portions of lint, made wet with spirit of wine and tincture of myrrh, or oil of turpentine and the same. And in instances where there are itchings, with pimples, and improperly formed granulations, the applications should be pledgets of lint spread with the yellow or black digestive, prepared without lard, to which has been previously added one drachm of finely-powdered verdigris to four ounces of the digestive, or a drachm of well-powdered red precipitate to two ounces of the digestive. These may be had recourse to once a day, or once in two days, according to circumstances. In these ways these ulcers may be filled up with new flesh in an easy and expeditious manner, and the healing of them be readily accomplished, provided that proper internal remedies be given at the same time, such as submuriate of mercury or calomel, in small quantities occasionally, oxide of antimony and guaiacum gum resin, in doses of one ounce of each, every day or two, and cinchona bark in rather large proportions.

But where ulcers of this kind are disposed to fill up too fast, and thereby to produce too great a quantity of proud flesh, it is necessary to check and repress them; which may be best performed by the application of dry lint, and proper substances in the form of dry powder; as the nitric oxide of mercury, red precipitate, and burnt alum, in fine powder, calamine well powdered, and many other such matters, being careful that not any thing of a greasy nature be had recourse to. When the fungus still continues troublesome, the ulcer may be dressed with lint or tow which has been dipped and wrung out of the solution of sulphate of copper, or blue vitriol water, or some other similar solution; and if the edges be in a callous state, making a sort of rim round it, nitric oxide of mercury, red precipitate dressings, should be applied upon them. The material for spreading these with is best prepared, by having three drachms of red precipitate or nitric oxide of mercury, well rubbed with a little oil, and then intimately mixed and incorporated with four ounces of resin cerate, and half an ounce of oil of turpentine. This method answers better, in these cases, than either cutting the callous edges away, eating them down with caustic, or repressing them by means of the actual cautery.

It is, however, considerably more slow in effecting the purpose, though more safe, as being less apt to produce too much inflammation, which, in the place of removing such hardnesses, is frequently disposed to render ulcers of this sort more tedious in the cure and more ready to throw up proud flesh.

COMPOUND ULCERS,

Are all those in which, besides the ulcers in the fleshy parts, there are some other diseased parts contiguous to them and connected with them, either in the bones, tendinous fleshy coverings, or glandular parts.

Where the bones are affected, ulcers of the carious kind often take place, which have very different appearances, according to circumstances. These are, of course, more tedious and difficult in the cure than those of the common sort; and more or less so according to the nature of their situations, and the causes from which they proceed.

In many cases of this nature, it will be necessary, in the first place, to promote and assist the exfoliation of the bones, which may commonly

be accomplished by exposing them and applying lint to them wet with the tincture of myrrh, or some other spirituous application, loosing the different portions of them occasionally, as it may be suitable and convenient. When the whole of the diseased parts of the bones have been thus removed, the ulcers usually heal up in a ready manner, without much further trouble.

Where, in the fleshy parts, there is a small narrow opening at the entrance, which dilates into a wide spreading space at bottom, the ulcer is said to be of the *cavernous* kind. These often become of this nature, merely on account of their being situated in places where bandages cannot be applied. They are not, however, so troublesome in their management as those of some other kinds, as those of the sinuous nature. In many instances of this sort, especially where the ulcers are deep, with narrow openings, and wide bottom spaces, they will require to be laid open in a full and complete manner. The matter being the most perfectly exposed and discharged by the use of the lancet, and, consequently, the ulcers the most readily brought into the healing state. But where they are in such situations that they cannot be fully laid open with safety, and where the habit of the body in the animal is good, they are sometimes capable of being cured in the manner of simple wounds; but this is always a mode of cure which is liable to suspicion in such cases, and which is seldom fully to be depended on.

Where ulcers of this kind do not fill up in a proper manner, and are found, on using the probe to have sinuosities, they must be managed in the way proper for ulcers of that sort.

When ulcers run in a slanting manner, and proceed from collections of matter between the muscles or their tendons, they are denominated of the *sinuous* kind. These are not unfrequently attended with considerable trouble and difficulty, particularly when the sinuosities terminate near the large joints.

Where these sorts of ulcers do not readily give way to the use of stimulant irritating injections, such as solutions of the sulphate of copper or blue vitriol, burnt alum, oxymuriate of mercury, or corrosive sublimate, *&c.*, and where bandages cannot be applied to them, they should be immediately laid open in their whole length by means of incision, as when they are suffered to continue for any length of time, they are apt to run deeper and deeper among the parts in which they are situated, until they reach the bones, which they sometimes render carious, and the cure becomes tedious and difficult, the value of the animal being thereby greatly lessened or wholly destroyed.

Where ulcers have tubular connexions that run in different winding directions, and are smooth and callous on the insides, they are of the *fistulous* kind. These are, for the most part, attended with all the difficulties of the preceding sort, and sometimes with greater, as they are situated not unfrequently among the joints and other inconvenient parts, which is a circumstance of serious consequence to horses, often rendering them of little use, even when the cure is performed.

Ulcers of this kind mostly take place somewhat in this manner: there is at first inflammation, to which a tumour or swelling succeeds, which forms a collection of matter, which, if not discharged by incision and healed by means of proper pressure, descends and penetrates deeper, causing a sinuous ulcer. Where this has been of long duration, or where it takes place in an unhealthy animal, or one which has a bad habit of body, different sinuses form

themselves, the matter making its way from one to the other by small connecting tubes or passages; in which cases, the insides are mostly lined with callous coats or coverings, so that no re-union can again occur, until such passages are laid into one, and their callous parts wholly destroyed. This may be effected by means of proper incisions being made; after which the parts should be dressed with finely-reduced nitric oxyd of mercury, or red precipitate powder, or with portions of lint dipped in a solution of sulphate of copper, or blue vitriol in water, or of oxymuriate of mercury, or sublimate in lime-water, in the proportion of from one to two drachms of the sublimate to a quart of the lime-water, as the circumstances of the cases may be.

It occasionally happens, that common collections of matter in particular parts are converted into sinuous and fistulous ulcers by improper management. This is probably, in most cases, caused by the improper use of long hard tents, which have a tendency to divide and separate the parts, and thereby to render such collections more deeply seated, and, in some instances, to run into sinuses which cannot be reached in the ordinary way. The frequent and improper use of the probe has often an effect in the same way. In collections of this sort, the weight of the matter causes the contiguous cellular parts to separate readily, and give way when even a slight force is rudely applied, and to form deep sinuosities; the prevention of which, in all such cases, is best accomplished by supporting the parts, and keeping them properly close and tight by means of bandages. Sometimes, also, a depending opening may be made for the discharge of the matter in some other direction, or a seton may be introduced for the same purpose.

In some of these ways accidents of this nature may often be avoided.

In cases where there is a great afflux of fœtid matter to the part with inflammation, swelling, and internal disorder, the ulcers are said to be of the *putrid* kind. These are always dangerous in their nature, as proceeding from a bad diseased state of the constitution of the animals. Where the discharges of fœtid matter are considerable from them, they are often disposed to terminate in mortification or some other unfavourable way.

Whatever may be the causes of them, they constantly exist under some unfavourably morbid condition of the body, which, of course, requires to be, in the first place, corrected by proper internal remedies, according to the nature and circumstances of the cases. The external means are various, such as proper stimulating acetous cataplasms, and poultices, with suitable spirituous opiate applications, *&c.*

Where ulcers are situated among the veins or in venous parts, and the veins are soft, and filled or enlarged with blood, they are commonly said to be of the *varicose* kind. These sometimes take place in horses which are affected with the farcy and other similar complaints. When they are situated among the blood-vessels, they are frequently of a spongy nature, and difficult to be managed, mostly discharging a bloody ichorous fluid. Some of those ulcerations which creep along the veins in the limbs are also of this description, and are equally troublesome and difficult of cure, on account of the exertions of the animals. But where there is only a single ulcer of this nature, it may be readily healed by suitable applications, and the use of bandages in a proper manner.

In the cure of ulcers of this nature, the use

of astringent applications, such as those made by steeping and dissolving oak bark, or other similar barks, with alum and sulphate of zinc or white vitriol in strong vinegar or other similar liquids, are very beneficial. The discharge, in these cases, which is commonly of a thin, bloody, watery quality, is by these means rendered more thick and dry, which has a tendency to promote the healing process. In cases where the vessels continue in a weak relaxed state after the healing up of the ulcers, firing may be resorted to, with the view of strengthening the parts, by the power which it has on the coats of the veins, as well as, in some instances, by destroying the connexion of the veins with the ulcers.

There is a sort of watery ulcer sometimes taking place in the legs of horses, which has something of this nature in it, and which requires similar treatment in its cure.

Where ulcers take place in the glandular parts, they are usually said to be of the *cancerous* or *scrophulous* kind, according to the nature and sort of glands in which they are situated, which are sufficiently distinguished by their appearances; the former is very offensive, extending itself in a rapid manner, and causing great destruction of the part, while the constitution is often undermined; the latter is less offensive in its nature, and more slow in its progress, there being considerably less action in the part. In cancerous ulcers the consequences are equally bad as in those of the putrid kind; but there is more respite given in them to the animals, as they will languish under them for a great length of time, until they are quite worn out. This is likewise the case in other anomalous ulcers, as in those which take place in some sorts of glanders, as well as in other diseases. The cure, in these cases, is extremely difficult and uncertain, being but seldom practicable. Ulcers of this nature sometimes exist in horses in connexion with the farcy and glanders, and they are subject, in some cases, to warts of a cancerous tendency, which, when deeply seated, are liable to degenerate into true ulcers of this sort. Injuries done to glandular parts are very apt to produce ulcers of this nature.

In the treatment of all ulcers of this sort, the applications should be of the mildest and least irritable kind.

Proper internal remedies are likewise very advantageous in some cases.

In all old ulcers, the ultimate healing process may be greatly assisted and promoted, by having recourse to narrow slips of sticking-plaster, for drawing together the sides, and supporting the parts in a proper manner. The hair, in all such cases, must be carefully removed before the slips are applied.

Besides the above modes, ulcers may be produced in other ways, as from neglected or improperly-managed wounds, bruises, or other accidents; and from particular states of the blood and secretions, which sometimes, at first, only appear in the form of tumors, as in the case of poll-evil, &c. There are also, occasionally, internal ulcers, as in the lungs, liver, kidneys, &c., which produce wasting and emaciation.

Section X.—*Nature, Formation, and Uses of the different Parts of the Horse.*

BONY STRUCTURE, OR SKELETON OF THE HORSE.

The subjoined *plate* explains the nature of the bony structure of the animal, which may be conveniently and properly divided into the *head*, *trunk*, and *extremities*.

In this *plate*, the letters and figures relate to

the several bones of which the head is formed: *a a a a* show the os frontis, forehead, or frontal bone; *b b* the parietal or vertical bone; *c c c* the occipital, or bone which by some is called the *knoll* bone; *d d*, the temporal bone, made up of two parts, the squamous and petrous; *e e*, maxilla superior, or anterior bone; *f*, jugal, or cheek bone; *g g*, nasal, or bones of the nose, *h*, os unguis; *i i i*, posterior jaw, or maxilla posterior; which are all the bones forming the head that appear on a side view of it.

The figures below relate to *particular parts of the bones*, as, 1. the petrous portion of the temporal bone, with a hollow process which forms; 2. the meatus auditorius, or opening of the ear; 3. the maxillary process of the temporal bone; 4. the cuneiform process of the occipital bone; 5. the zygomatic process of the temporal bone, joined to the jugal process, and forming the zygoma, or arch of this part; 6. the occipital protuberance; 7. the orbit, or cavity of the eye; 8. the coronoid process of the posterior or lower jaw; 9. the condyloid process that articulates the posterior jaw with the head; 10. a hole, called *superciliary foramen*, through which the frontal nerve and artery pass; 11. a process of the frontal bone joining with the zygomatic process of the temporal bone; 12. a hole transmitting a nerve and artery to furnish the face; 13. a third foramen, from which proceeds a branch of the fifth pair of nerves, and an artery; 14. the grinding teeth; 15. the tushes; 16. the nippers.

NECK, OR CERVICAL BONES.

A A A, &c., the seven cervical or neck vertebræ, the first of which, *b*, is called the atlas; as the second of them is termed dentata; *c*, marks the transverse process of the first; as *d d d d d d*, do the same processes of the other six; *e e e*, &c., the superior or anterior oblique processes of the six last, in the first it is wanting; *f f f*, &c., their inferior or posterior oblique processes; *g g g*, &c., the spinous processes of the same; the rest of the bones of the spine are, *a a a a a a*, &c., the eighteen dorsal vertebræ; *b*, their spinous processes; *c*, their transverse processes; *d*, their upper or anterior oblique processes; *e*, their lower or posterior oblique processes; *f*, the cartilage interposed between each dorsal and lumber vertebræ; one is only marked, which may serve as a guide for the rest.

B C D E F G, the lumbar *vertebræ*, or those of the loins, in which the same description answers as the dorsal, the great length of their transverse processes only being seen; 1, 2, 3, 4, 5, mark the five pieces of which the *sacrum* is composed in the young ungrown animal, but which, by age, becomes one entire bone; 1, 2, 3, &c., to 18, the eighteen bones of the tail.

BONES OF THORAX AND SHOULDER BLADES.

A A, the sternum; 1, 2, 3, 4, 5, 6, 7, 8, the eight true ribs, so called, as their cartilages are immediately attached to that part; 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, the false ribs, so called from their cartilages not being inserted into the sternum, but into each other; *a*, the head that articulates with the transverse process of the first vertebræ of the back; *b*, the anterior part of the head that is connected to the body of the seventh vertebræ of the neck; the same description suits for each other rib.

A A, the scapula, or shoulder blade; *a*, the superior, or, more properly, anterior spinatus fossa; *c*, the spine which divides these two fossa, and from which they take their names; *d*, the upper costa; *e*, lower costa; *f*, the neck; *g*, coracoid apophysis: at the upper part is seen a line, shewing the extent of the cartilage of the scapula.

BONES OF FORE LEGS.

B, the humerus, or bone of the arm, or fore leg; *i*, its head, that articulates with the shoulder blade; *k*, its external condyle; *l*, the fossa, or cavity, receiving the radius; *m*, that which receives the cubitus. C, the cubitus or ulna; this, in the young animal, is a distinct bone, but, in the grown horse, is fastened to the radius; *b*, the process called olecranon, forming the elbow. D, the radius; *o*, its upper end; *p*, its lower extremity, forming a part of the knee. E, the carpus, which, in the horse, is formed of seven bones; the trapezium, which in the human subject forms the eighth, is wanting in the horse; this part, forming the wrist of man, is, by long custon, called the knee of the animal. F, the metacarpus, or shank bones, to each of which are joined two imperfect metacarpal bones, marked *g*, called, by the French, *épineux; r, r*, the sesamoid bones. G, the pastern bones. H, the coronet, or little pastern bones. I, the coffin bone. There is another sesamoid, or small bone, within the curve of the coffin bone.

PELVIS AND HIND EXTREMITIES, OR LEGS.

K, the pelvis, which is composed of three bones in the young animal, which are, *a a a a a*, the ilium; *b b b*, the ischium; *c c c*, the pubis; *d*, *foramen magnum*. I, the femur; *e*, its head, articulating with the acetabulum, or cavity in the pelvis; *f f f*, the great trochanter; *g*, the linea aspera; *k k*, the patella, or stifle, but more properly the knee bone. M, the tibia. N, the fibula; this, as in the cubitus, or ulna, is firmly attached to the tibia, and is an inconsiderable bone, compared with that in the human subject. O, the tarsus, consisting of six bones, the great cuneiform bone being wanting, which, in the human subject, forms the seventh; *b b*, the calcaneum. P P, *p p*. the metatarsus, which are of the same description as in the anterior extremities, or fore legs, in this animal.—See *plate*.

MOVING POWERS, OR MUSCLES OF THE HORSE.

These have much similarity, in the structure and functions, to those in the human subject, and their references and descriptions are these in the subjoined *plate*.

IN HEAD.

a b c d, The lateral dilator of the nostril and upper lip; *b, c*, its insertion into the upper lip and nostril; *d*, its origin; *f*, the anterior dilator of the nostril; *g h i k*, the orbicular muscle of the mouth; *g*, the part belonging to the lower lip; *h*, the corner of the mouth; *i*, the part belonging to the upper lip; *k*, fibres which tend upwards to the insertion of the nasal muscles of the upper lip; *l m n o*, the long nasal muscle of the upper lip; *l m n*, the fleshy part; *m*, its origin; at *n*, the tendon begins; *o*, the tendon; *p p q*, the masseter; *r* 8 8, buccinator; *s t*, the broad ligaments of the eye-lids, which are membranous elongations formed by the union of the periosteum of the orbits, and pericranium along both edges of each orbit; *u u w*, the ciliaris muscle; *w*, its origin; *x y*, a muscle belonging, in part, to the ala narium *z*, but chiefly to the *concha narium* inferior; *x*, its insertion into the alæ narium; *y*, its origin, by a small tendon from the bone along the nasal muscle of the upper lip; below *x*, it passes under the *alæ narium* to the inside of the nostril, and is there inserted into the *concha narium* inferior, *z*, *alæ narium* and *septum narium*: 2, 2, 3, the temporal muscle; 3, its insertion into the coronary process of the under jaw-bone; 4, 4, muscular fibres which extend and draw outwards the pituitary membrane; 5 5, membrana pituitaria; 6, 7, 7, a muscle called caninus, or elevator of the corner of the mouth, arising from the upper jaw-bone, under the muscle

x y, and inserted at 7 7, into the buccinator; 9, 10, the depressor of the lower lip; it arises along with the buccinator, and is almost divided into two muscles, one superior, the other inferior, for the passage of nerves and blood-vessels to the lower lip; the superior arises tendinous, and is inserted fleshy into the lower lip laterally; the inferior arises fleshy, and is inserted tendinous nearer the middle of the lower lip; 12, the elevator of the chin; 13, a nerve going to the alæ narium; 14, vena-angularis, which is a branch of the vena jugularis externa anterior; 15, arteria angularis; 16, a branch of the vena temporalis; 17, 17, two valves, in a branch of the jugular vein; 18, branches of the nervous maxillaris inferior. They are branches of the third branch of the fifth pair of nerves. 18, The salivary duct; 20, the anterior cartilage of the outer ear; 21, the outer ear; 22, 23, a muscle arising from the anterior cartilage at 22, and inserted at 23 into the outer ear; 24, a muscle which arises by two fleshy heads from the internal surface of the anterior cartilage, and is inserted into the lower convex part of the external ear near the root, nearer the posterior edge than the anterior. It assists the posterior part of the retrahens when in action; 25, a muscle which is a sort of antagonist to that marked 24; it arises from the ridge of the occiput under the retrahens, and is inserted into the ear at 25. It helps to turn the opening of the ear forwards; 26, 26, 26, *c*, the parotid gland.

IN NECK.

a b c, Sterno mastoidæus, or sterno maxillaris: it arises from the top of the sternum at *b*, and is inserted by a flat tendon into the lower jaw-bone, under the parotid gland at, or near, *c*, is likewise inserted into the root of the processus mastoidæus by a flat tendon; *d*, the spungy fatty substance of the mane, cut directly down the middle, and the left side remaining on to show its thickness; *e*, ligamentum colli; *f f*, caraco-hyoidæus; it arises from the upper and internal side of the humerus, betwixt the insertions of the subscapularis and teres major by a flat membranous tendon; it begins to be fleshy as it comes from under the serratus minor anticus, and is inserted into the os hyoides; *g*, sterno-hyoidæus; *h i*, transversalis; *h*, the tendinous part; *i*, a fleshy part; *k l*, the tendon of the trachelomastoidæus; *l*, a fascia or membranous part; *m n*, rectus internus major capitis; *m*, its lowest origin from the transverse process of the fourth vertebra of the neck, and the part *p*, of the longus colli, which origin is sometimes continued down almost as low as the lower part of the transverse process of the fifth; *o o o o*, inter transversalis minores colli; they run from the transverse process of one vertebra to the transverse process of the next to it; *p q*, longus colli; *r s t u w*, splenius; *r* the part coming from the origin of this muscle, which is from the expansion common to it, and the serratus minor posticus, *&c.* It arises tendinous from the ligamentum colli under the rhomboides, and fleshy about the superior part of the neck. At *s* it is inserted into, or attached to, the transversalis; at *t*, to the tendon of the trachelomastoidæus; *u*, the part which goes to be inserted into the occiput. It is also inserted into the transverse processes of the fifth, fourth, and third vertebræ of the neck, by flat strong tendons, which run on the internal side of the muscle: it is externally fleshy within a very little of these insertions. *x*, Sternothyroidæus; *y*, hyothyroidæus; *z*, cricothyroidæus. And, the lower constrictor of the pharynx, 1, 1, vena jugularis communis; 2, vena jugularis externa anterior; 3, vena jugularis externa, posterior, or superior; 4, part of the carotid artery, or carotis communis; 5, glandulæ claviculares, or

axillares, but in this animal there are no claviculæ, or cervicales inferiores, or thoracicæ superiores lymphaticæ. They are lymphatic glands. 6, 6, 6, 6, Branches of the cervical nerves, accompanied with arteries which are distributed to the musculus levator humeri proprius, *&c.*, and integuments; 7, branches of the cervical arteries and veins coming out of the splenius to go to the trapezius and integuments.

MUSCLES IN NECK AND TRUNK, INSERTED INTO THE SCAPULA.

a a b, Rhomboides; *a a*, the origin from the ligamentum colli: it has another origin from the superior spines of the vertebræ of the back; *b*, its insertion, or the part going to be inserted into the scapula; *e d e f*, serratus minor anticus; *c d*, the fleshy part arising near *c*, from the sternum, and part of the first rib, and from the cartilaginous endings of the second, third, and fourth ribs, near their joining to the sternum; and is inserted into the superior costa near the basis scapulæ and tendinous surface of the supra spinatus; and is connected to the teres major by the fascia *e f*, which is sent from its muscle over the infra-spinatus scapulæ, and supra-spinatus scapulæ to its outer edge. Its flat tendon may be separated some part of the way to the basis and spine of the scapula from the tendinous surface of the supra-spinatus scapulæ. *g h i k l o p*, Serratus major anticus; *g*, part of its insertion on the external part of the scapula; the rest of its insertion possesses about half of the internal part of the scapula; *b*, the part which arises from the transverse process of the third vertebra of the neck; *i*, that from the fourth; *k*, that from the fifth; *l*, that from the sixth; *o*, its origin from the seventh rib; *p*, from the eighth. This muscle arises from the six superior ribs, also within about five minutes of the cartilages. It does not adhere to the intercostals as it passes over them; but at the extremity of its origin sends off a membranous tendon over the intercostals, towards the sternum: it arises all the way, from its first beginning, from the external surface of the ribs, up to the insertion of the tendons of the sacro lumbalis.

MUSCLES AND TENDONS INSERTED INTO THE HUMERUS AND CUBIT.

1, 1, 2, 3, 4, 5, 5, 6, Pectoralis; 1, 1, its origin from the linea alba abdominis; 1, 2, its origin from the lower part of the sternum; 3, its origin from the superior part of the sternum; the part 3, 4, which is the superior part of this muscle, sends a flat membranous tendon in betwixt the biceps and levator humeri proprius, to which it is joined before its insertion into the humerus; 5, 5, 6, the flat tendon cut off at 5, 5; the external part below this runs down the cubit; *a b c d e f*, supra spinatus scapulæ; it continues its origin from the scapula from *a* to about *b*, and is inserted at *c* into the head of the os humeri, and capsular ligament on the outside of the origin of the biceps cubiti; and by the other half into the head and capsular ligament of the os humeri, or the inside of the origin of the biceps cubiti; the lower part is covered by a tendinous fascia, which runs from the supra-spinatus to the serratus minor anticus, and binds that muscle in its place; it is pretty strong at *d*, but stronger at *c*, below the protuberating part of the humerus; at *e f*, a fascia runs over this muscle from the seratus minor anticus to the teres minor; *h i k l m n*, infra-spinatus scapulæ; from *h* to *i*, are marked traces of the superior part of the trapezius's insertion on the surface of this muscle, it is attached to it at *i*, but strongly inserted into it near *h*, *h k*, marking the insertion of the superior part of the trapezius upon this muscle; *l*, the beginning of

its origin from the dorsum scapulæ, and the cartilage on the border of that bone; *i k m.* marks the inferior outline of this muscle, where it is bounded by the teres minor, but not easily distinguished, by reason of the tendinous surface by which they are both covered and attached together; *n*, its strongest tendon, by which it is strongly inserted into the protuberating part of the humerus under the tendinous expansion which goes from the teres minor to the lesser anterior saw muscle. The lines upon this muscle shew the direction of some of the principal fibres of the tendinous covering; *o p q q*, teres minor; *o*, its origin along with the triceps cubiti; *p*, its insertion into the fascia arising from the humerus; *q q*, its insertion into the humerus; from *q* to *k*, it sends off a fascia that connects it to the serratus minor anticus. The outline is much obscured by the fascia or tendinous covering of part of this muscle, and the infra-spinatus with the supra-spinatus, which connects them; *k p*, marks the cutting off of the membranous tendon of the superior part of the trapezius, as *h k* marks it upon the infra-spinatus; *r r s t t u w*, the latissimus dorsi; *r r s t t*, its flat tendon; *r r*, its origin from the spinal processes of the back; at *r s*, this tendon is cut away from its attachment to the fascia lata; and at *r* I, it is entirely cut away to uncover the glutæi; *t t u w*, the fleshy part; *t t* the origin of the carnous fibres; *r r u*, mark the traces of the inferior part of the trapezius, enclosed betwixt the tendon of this muscle, and a tendinous fascia which covers them both together; the said fascia being cut off at *r u*, and left on the latissimus dorsi, leaves the marks of the trapezius very plain; *t u u*, shews the direction of the fibres of the tendinous fascia which connects this part of the muscle to the triceps cubiti: these fibres run over the infra spinatus towards the insertion of the trapezius *h k; w*, the fleshy part going to be inserted into the humerus; *s* I, the aponeuroses which runs towards the obliquus descendens, and seems to be lost upon it, degenerating into a membranous state.

IN TRUNK.

I I I I I K K K L M, obliquus externus, or descendens abdominis; I I I I I, the place where the thickest carnous part ceases to arise from the ribs, and begins to run over them without adhering to them or the intercostals; K K K, the ending or insertion of the carnous part into the tendinous part; L, the linea alba, or strong broad aponeurosis, formed by this and the internal oblique muscle; it is like a broad, strong, ligament, much resembling that of the neck, forming a sort of rugæ, which appear on its external surface, running from above downwards: it has a communication with the serratus major anticus by an aponeurosis, which arises from that muscle; its first, or superior origin, is from the fifth rib, it arises tendinous from the back part of the insertions of the indentations of the saw muscle into the ribs, and at its origin receives the insertion of the lower part of the indentations of the saw muscle; it arises from the posterior or inferior labeum or edge of the eighth rib, nearly all the way from I, to the insertion of one of the indentations of the superior, or lesser, posterior serratus; from the posterior labeum of the ninth, almost as high as where an indentation of the lesser serratus posterius is inserted into the superior or anterior labeum, of the same rib; it also arises from the tenth; and, in this subject, opposite to the insertion of the serratus minor posticus, it arises from all the ribs below that from the part where the indentations of the serratus major posticus are inserted, or a little higher than that more externally, which is the case

generally with the three or four last digitations, but most as they are the lowest, and runs over the indentations of the saw muscle; these digitations continue their origin from the ribs all the way down to the part marked I I I I I, and unite with the intercostal muscles in their passage; this muscle has a communication with the latissimus dorsi by an aponeurosis, which is sent over it by that muscle; I *r*, marks the cutting away of the tendon of the latissimus dorsi to uncover the glutæi, *&c.;* it is inserted into the os ilium and os pubis, and to its fellow by the linea alba.

The blood-vessels and nerves which are marked on the thorax are those which are distributed to the parts taken off as the membrana-carnosa, *&c.*, and integuments; the nerves come from the nervi dorsales, or costales, and nervi lumbares; the arteries from the arteriæ intercostales inferiores and arteriæ lumbares; the veins from the venæ intercostales and venæ lumbares.

IN RIGHT UPPER LIMB.

N O P, triceps brachii; N, the head, which is called extensor longus major; O, the short head of the triceps, called the extensor brevis; P, the head, called brachialis extensor longus minor. The short head, O, arises from the humerus, the other two from the scapula; its insertion is into the olecranon; Q R S, biceps brachii, or coraco radialis; Q, the belly of the short head; R, the belly of the long head; S, the fascia of this muscle, which is sent down upon the muscles of the cubit; *a* A *b c d e e g h*, a fascia or strong membranous production lying over the extending muscles on the cubit; *a* A, its origin from the edge of the triceps from the levator humeri proprius, and from the two protuberating parts of the humerus, between which it is extended like a strong ligament, and gives origin to some of the fleshy fibres of the extensor carpi radialis: it is inserted into the radius at *b c b*, at *b b*, into the ligament; and being expanded over all the extending muscles which lie on the cubit, is inserted into the internal side of that bone, all along the bounds of the bending muscles on that side; there lies under it the extensor carpi radialis, of which *d* is the fleshy part; *e e f*, the tendon; *b c*, extensor digitorum communis; *g*, what is analogous to the extensors of the thumb. This fascia is attached to the upper edge of the extensor digitorum communis, and may, perhaps, be properly called a flat tendon, arising in common to this muscle, and the extensor carpi radialis, and sending an expansion not only over but also under them, and being attached to the bone on each side down to the carpus, and also to the ligaments that bind down the tendons, running over the carpus, it makes a continued case for them from their originations down to the carpus, confining them steady in their proper places. It communicates with the fascia of the biceps muscle, and with it is inserted into the tendon of the extensor carpi radialis; *f*, the tendon of the extensor carpi radialis, inserted into the metacarpal bone; *i*, the tendon of the extensor digitorum communis going to its insertion into the coffin bone; *m n o o* P *p q r s t*, an expansion arising at *o o*, from the articulating ligament, and at *n* from the olecranon: it receives an addition from the longus minor, and internal protuberance of the humerus, and expansion of the biceps muscle, then descends over the bending muscle down to the ligaments on the carpus, to which it is attached, as well as to the bones of the cubit on each side of the bounds of the bending muscles; the different directions of its fibres being marked, as at *q r*, *&c.*, and its insertion into the bone on the external side, as at P *m b;* it then runs into the

ligaments. It gives rise to fleshy fibres of the muscle *m*, which is analogous to the extensor minimi digiti, all the way from the out-line *q m b* to the bone where the expansion is inserted. It has a strong insertion at P into that protuberating bone of the carpus called the os pisiforme or orbiculare, and another betwixt the tendons *s s* of the flexor carpi ulnaris, besides its conjunction with the ligaments on the carpus, to which it is a considerable addition; *t*, a part of the expansion which appears like a number of small tendons. At *z*, a ligament arises, which joins the tendon *m* near *m w*, and goes along with it to be inserted into the great pastern. A slender ligament arises about P, which covers the tendon *m*, and then runs between it and the tendon *i*, to be inserted into the upper and anterior part of the great pastern; *h h* P *p u w x y y z*, ligaments which bind down the tendons lying upon the carpus; 16 *h h y y u*, a ligament whose fibres run in a transverse direction over the anterior part of the carpus to which the carnous membrane adheres at *u;* at 16, the ligament *h h y y* 16, adheres to the bursal ligament; *x w*, the insertions of the articular ligament; betwixt *c* and *h* is a ligament proper to the extensor digitorum communis, inserted at two protuberating parts of the radius, one on each side the channel in which the tendon lies; *p z w*, a ligament, the fibres of which run in the upper part transversely, in the lower rather obliquely downwards; it lies on the lateral or external part of the carpus—it was covered in the *plate*, first by the production of the membrana carnosa, and pectoralis, but rather the membrana carnosa, as it lies on the external part; 1, 2, a ligament arising at 1, and inserted at 2 *w*; it helps to bind the projecting bone of the carpus, and serves as a stay to it, when the flexor carpi ulnaris is in action: there is a large vein protuberating under it; 3, a ligament which helps to bind down the tendons of the sublimis and profundus; 4, the tendon of the profundus; 5, the tendon of the sublimis; 6, a vein arising from under the hoof, called vena plantaris externa; 7, nervus plantaris externus; 9, an articular ligament; 10, a ligament sent from the interosseus, and inserted into the tendon of the extensor digitorum communis, which it binds down; 11, 12, the horny part of the hoof; 11, the superior part; 12, the sole, or inferior part, going under the coffin bone; 13, a substance resembling the villous surface of a mushroom, arising from the coffin bone, and received by the like arising from the hoof, which it mutually embraces.

IN RIGHT LOWER LIMB.

a b c c d d d D *e f g g g h i k l*, Shew the fascia lata; *a*, its origin from the ilium; *b*, its anterior fleshy belly; D, the posterior fleshy belly, over which the fascia lata sends a strong membrane, as well as under, so that it is received or contained in a duplicature of the fascia lata; the fibres *d d d* D *e*, arising from the superior or external fascia, and descending to be inserted into the inferior on its external side; the part *a b c*, arises from the spine of the os ilium, internally tendinous; fleshy fibres arising from that flat internal tendon, and descending to be inserted chiefly into the inside of the fascia in the angle *c d g g;* the fleshy part in the superior angle *d*, being thickest, it gradually diminishes till it is lost in the line *g g;* the dark colour of the fleshy fibres make some appearance in this angle, though the fascia is very strong, but not near so much so as the part *a b g*, because the covering of that is a little more than a common membrane; the line *a e*, marks the place where the fascia lata is cut off, before it passes between this muscle and the glu-

tæus externus, to be inserted into the anterior costa of the os ilium; *d e*, marks the place where the production of the fascia lata, which is sent over this muscle, is cut off; and *d d d*, the place where it joins to the broad tendon of this muscle, in which place it is cut off; *e f*, shews the place where the fascia lata is cut from its conjunction with what may be called the broad tendon of this muscle, in order to pass down over the leg and foot; at *b*, the tendinous surface of the rectus cruris makes its appearance through the tendon of this muscle; *i k*, shews the tendon or ligament which binds the patella to the tibia protuberating; *l*, the ligament which binds the patella to the external protuberance of the os femoris. This muscle is inserted, by a strong tendon, into the tibia at *i*, adhering to the tendon of the anterior and middle part of the biceps muscle in its way; its adhesion is all the way from *i* to the superior 4, where it has a little insertion into the patella; *m n o o p*, glutæus externus; *m* a fleshy origin from the ligament which runs betwixt the spinal and transverse processes of the os sacrum; *m n*, the place where the fascia lata is cut off from the production which it sends under this muscle, or from its attachment to the tendinous surface of the internal part of this muscle, which arises from the ligament running betwixt the os sacrum and ischium; and which receives first the insertion of those fleshy fibres which arise betwixt it and the ends of the spinal processes of the os sacrum from the same ligament, and then the fibres *m n o o*, which arise from the fascia lata and descend obliquely inwards and downwards to be inserted into it; *o o*, the place where this muscle ceases to arise from the fascia lata, and goes to be inserted at *p*, into the lateral protuberance of the thigh bone; it sends off a fascia over the posterior part of the thigh bone, which runs in a transverse direction, and into which the pyramidalis is inserted, or joins in with it before its insertion into the superior or rather posterior part of this protuberance; *q Q r s t*, glutæus medius; *q r s*, its origin from the tendinous surface of the sacro lumbalis; *s*, its origin from the ilium; *q Q r s*, the part which is covered by its own proper membrane, and does not adhere to the tendon of the latissimus dorsi, &c., nor fascia lata; *q Q t*, the part which receives fleshy fibres from the fascia lata, going under the glutæus externus to be inserted into the great trochanter, *i k l u u w w x y z*, 3, 4, 4, 5, 7, 7, 8, 8, 9, 11, biceps cruris; *u u w w*, mark the superior or anterior head where it arises by fleshy fibres from the fascia lata; its principal origin is from the ligaments which run from the spinal to the transverse processes of the os sacrum, and from thence to the tubercle of the ischium; *w* 5, *y z*, mark the inferior or posterior head, where it arises by carnous fibres from the fascia lata; its principal origin is from the tubercle of the ischium, beginning at the extremity of that tubercle from the inferior angle, and continuing its origin by a flat strong tendon, about six minutes along the inferior edge of that bone; this tendon is continued down from the tubercle towards 5, betwixt *y* and *z*, from which, a little above *y*, the fleshy fibres *y* 5, 7 *l* begin to arise; but the fleshy part, *x z* 7, begins its origin from the tubercle, and continues it down the said tendon; *w w l* 4, the fleshy part of the anterior head, where it does not arise from the fascia lata, it is inserted into the patella, and superior and anterior part of the tibia; betwixt *p* and *w* are marked tendinous fibres which bind the anterior part of this muscle to the external glutæus; and a little below that it is inserted into the thigh bone by a flat tendon, and by this insertion the anterior part of this muscle is kept from starting too much forwards,

the fibres of this tendon or ligament running in almost a transverse direction; the part *f* 4, 4 *l w*, lies under a fascia sent from the anterior part of the posterior head, to the tendon of the musculus fascia lata, which is cut off at *w f*, and on which the direction of its fibres is marked; *x z* 5, *y w l* 7, 7, the fleshy part of the posterior head, where it does not arise from the fascia lata; *l i* 8, 8, 9, 3, 7, 7, the tendon of the posterior head, which joins the tendon of the anterior head near the patella, and is likewise inserted at *i* 8, 8 into the anterior part of the tibia, all the way down to the ligament common to the extensor longus digitorum pedis and tibialis anticus, and into part of the upper edge of that ligament, and forms the tendon 11 with the fascia lata (which is cut off at 3, 9), and is inserted into the os calcis; 7, 7, 3, is the strongest part of the posterior tendon, which is inserted into the os calcis; 15, the tendon of the plantaris; 16, 17, 17, 18, 19, semi-tendinous; 16, its origin from the ligament which runs between the spines of the sacrum and the ischium, from the ligament betwixt the spinal and transverse processes of the os coccygis; 16, 17, 17, marks the part which receives fleshy fibres from the fascia lata; 18, the fleshy part which does not adhere to the fascia lata; 19, the tendinous production which wraps over the gemellus, to join in with the fascia lata and tendon of the biceps cruris; the lines 16, 17, betwixt this muscle and the biceps, mark the fascia lata where it runs in between these muscles; the posterior of the two lines marks the cutting off of the part of the fascia which runs over the semitendinosus to the large adductor of the thigh; its principal insertion is by a flat tendon into the superior and anterior part of the tibia internally; it is also attached to the plantaris, near the bottom of its fleshy part, by a flat tendon or expansion; 22, shows the large adductor of the thigh; 24, 25, 25, 26, 27, 30, 31, 32, 33, 34, ligaments which bind down the tendons, *&c.*, on the tarsus, the inferior and anterior part of the leg or tibia, and the superior part of the metatarsus laterally and anteriorly; 24, 25 25, a strong ligament common to the tendon of the extensor longus digitorum pedis and tibialis anticus; at 24, it falls off to be very thin, but continues to receive some origin of tendinous fibres from the tibia for some way upwards, which run internally till they are lost in the tendinous expansion of the biceps muscle, *&c.*, which is inserted into the upper internal edge of this ligament pretty strongly, but falls away to little or nothing in its way towards the external lateral part of this ligament; from 24 downwards, this ligament strengthens, as it descends towards 25, 25, where it is thick and strong: its origin, on the external lateral part of the tibia, is marked 25, 33: there is another strong ligament marked 26, proper to the tendon of the extensor longus digitorum pedis, which shows itself under the common membranous ligament 27, which covers it, and the articular ligament as well as blood-vessels, *&c.*, upon the tarsus, and is attached to the ligament 24, 25, 25; at 25, 25; at 30, are marked the directions of the tendinous fibres, in this ligament, which arise from the bones of the tarsus, and descend obliquely inwards and downwards; 31 marks fibres arising from the splint-bone, or a bone of the metatarsus, and running transversely over the anterior part of the metatarsus, joins in with the part 30; it is inserted into the superior and anterior part of the metatarsal bone; 34 marks some little appearance, by protuberation, of a ligament common to the tendon 37, and the blood-vessels marked 14; 32, shews a ligament proper to the said tendon 37, its origin and insertion, being both from the tibia; 35, a ligament which binds down the

tendons of the flexors; 36, 36, extensor longus digitorum pedis; 37, 37, peroneus anticus; 38, flexor digitorum pedis; 39, a branch of the arteria tibialis anterior; 40, plantaris; 41, flexor digitorum pedis; 42, 46, vena plantaris externa; 43, nervus plantaris externus; 44, the interosseus, *&c;* 45, a ligament sent from the interosseus *&c.*, by which the tendon of the extensor longus digitorum pedis, 36, is bound down, otherwise it would start from the bone when the fetlock joint gives much way; 47, 48, the horny part of the hoof; 47, the superior part; 48, the sole, or inferior part, going under the coffin-bone; 49, a substance resembling the villous surface of a mushroom arising from the coffin-bone, received by the like arising from the hoof, which it mutually embraces.

IN INTERNAL SIDE OF LEFT LOWER LIMB.

a, The tendon of the rectus cruris; *b*, vastus internus; *c d*, sartorius; *e e f*, gracilis; *g h k l*, semi-tendinosus; *g*, the fleshy part; *k l*, the tendon which is inserted into the tibia at *k*; at *l* it sends off a tendon to the gemellus, to which, at *o*, the fasciæ are attached; *m m m*, gemellus; *m*, a fleshy part; under *n* lies the tendon over which the tendon of the plantaris is twisted; *n*, a tendon formed by that going off from the semi-tendinosus at *l*, and by another tendinous fascia; *o p q r s*, the fasciæ which are inserted into the os calcis gemellus and plantaris; *o*, the place where the fascia lata is cut off; *p*, the part going to be inserted into the os calcis, on the external side; the part *q* joins with the part *r* to be inserted into the os calcis at *s*; *t u u w x*, the tendon of the plantaris arising from under the fascias and twisting over the gamellus at *t*; *w*, a part which it sends off to the os calcis, which makes a sort of ligament to bind in the tendon of the flexor digitorum pedis; it is spread a little upon the ligament 8, 9, 9, and inserted into it near its origin from the os calcis about 8; *y*, the tendon of the flexor digitorum pedis, lying under the thin ligament marked 3, 5, on the right leg in the *plate*; the bounds of it are here marked, though it falls off gradually into nothing more than a common membrane, and is insensibly lost as it descends from about *y*; the lowest part of its insertion into the splint-bone is about *y*, but is here hid by the blood-vessel; *z* 1, the tibialis anticus appearing under the fascia; 2, 3, 3, the ligament marked 24, 25, 25, 33, 36, in the *plate* of the right leg; 3, 3, its insertion into the tibia; 4, the ligament marked 30, on the right lower limb in the *plate*; 5, a ligament which covers the tendon of the tibialis posticus, arising from the posterior and inferior part, or internal inferior angle, and inserting itself into the articular ligament 9, 9; 6, 6, 7, a ligament arising at 7 from the astragalus, and inserted, at 6, 6, into a cartilage lying under the tendon of the flexor digitorum pedis, which, assisted by another ligament on the other side of the limb, confines it in its place. These ligaments seem to be a part of the fascia which covers the muscles on the external side of the limb, which (passing under the tendon of the flexor digitorum pedis) forms a cartilaginous substance as it passes, and is a smooth proper bed for that tendon to slide upon; 8, 9, 9, a strong ligament which binds the os calcis to the astragalus, os naviculare, ossa cuneiformia, and splint-bone, arising from a protuberance about 8, and inserted into the other bones of the tarsus and metatarsus about 9, 9; 9, 9, the articular ligament which binds the tibia to the bones of the tarsus; 10, 11, a ligament running over the tendon of the plantaris, inserted into the ligament 8, 9, 9, and splint-bone. It is marked 35 on the right leg in the *plate*; 12, 12, 12, a sort of ligamentous fascia between which and the bursal ligament

the mucilaginous glands are contained; 13, the ligament proper to the tendon of the extensor longus digitorum pedis, marked 26 in the right limb in the *plate;* 14, 15, 16, 17, the tendon of the extensor digitorum, at 14 going to be inserted into the last bone of the toe, or coffin-bone: it receives the ligament 19 at the part 16, and the ligament 20 at the part 17; and, in its passage down the toe, it adheres to the bursal ligaments under 21 and 20. It is marked 5 in the *plate;* 18, interosseus, *&c.;* 19, the ligament marked *d* in the *plate.* It arises from the interosseus, *&c.*, and is inserted into the tendon of the extensor longus digitorum pedis, and binds it down; 20, a ligament which arises from the internal, lateral, and inferior part of the first bone of the toe, and is inserted into the tendon of the flexor digitorum pedis, and binds it to this side, as 46 on the right lower limb does the same tendon to the other side; 21, vena saphena; 22, nervus sciaticus internus; 23, nervus plantaris internus; 24, vena plantaris interna; 25, 26, the horny part of the hoof; 25, the superior part; 26, the sole, or inferior part, going under the coffin-bone; 27, a substance resembling the villous surface of a mushroom arising from the coffin-bone, received by the like arising from the hoof, which it mutually embraces.

IN LEFT UPPER LIMB.

e, Part of the biceps which sends an expansion over the bending muscles lying upon the cubit; *def*, the expansion marked *mnoop*P*q rsst*, on the left upper limb in the *plate; gg*, the fascia marked *a*A*bcdeegh*, on the left upper limb in the *plate; h*, the tendon of the muscle, which is analogous to the extending muscles of the thumb, marked *g*, on the right upper limb, in the *plate; iiklm*, the ligament marked 16 *hhyyu*, on the left upper limb in the *plate;* the articular ligament appears under this: from *k* to *l*, this ligament communicates with the fascia *def; no*, a ligament arising at *n*, and inserted about *o*, like the ligament marked 1, 2, on the right upper limb in the *plate; p*, the ligament marked 3, on the right upper limb in the *plate.* It is a continuation of the ligaments marked *no* on the right, and 1, 2 on the left upper limb in the *plate;* it is here something thinner than the ligaments *no* and 1, 2, but as it descends down the limb, is soon insensibly lost in a membrane *q*, the tendon of the profundus; *r*, the tendon of the sublimis; *s*, a vein arising from under the hoof, called vena plantaris interna; *t*, nervus plantaris internus; *wx*, the tendon of the extensor digitorum communis; *w*, the part which is sent off from the principal tendon to be inserted into the superior and internal part of the great pastern; *x*, the principal tendon inserted into the coffin bone, but in its way is attached to the coronary bone on its anterior and superior part; *y*, a ligament which arises from the interosseus, *&c.*, and is inserted into the tendon of the extensor digitorum communis, which it binds down; *z*, the interosseus, *&c.;*—1, 2, the horny part of the hoof; 1, the superior part; 2, the sole or inferior part, going under the coffin bone; 3, a substance resembling the villous surface of a mushroom, arising from the hoof, received by the like arising from the coffin bone, which it mutually embraces. See the *plate.*

DIFFERENT VISCERA OR INTERNAL PARTS OF THE HORSE.

Under this head, is explained the several internal parts of the different cavities noticed below, with their principal blood-vessels, as seen in the subjoined *plate.*

CAVITIES OF THE CHEST AND BELLY.

There are, in most animals, three principal cavities destined, for the preservation of the

organs immediately essential to their existence, as the head, chest, and belly; a view of the two latter of these parts is contained in the *plate.*

THORAX.

The cavity of the thorax, or chest, is formed superiorly, by the dorsal vertebræ; inferiorly, by the sternum or breast-bone, and ensiform cartilage; laterally, by the ribs; and posteriorly, it is bounded by the diaphragm or midriff. In figure it is rather conical, with its base or largest part towards the abdomen, and its apex opposed to the neck. It is proportionably much smaller than in the human subject, and differing considerably in form, being very much contracted at its lower part near the sternum, in the true position of the animal. But this cavity is not at all times of equal magnitude; being alternately larger and smaller. This dilatation and contraction, is for the reception and expulsion of air; and is formed by means of muscles placed between the ribs, named intercostal; which draw the ribs forward, and dilate the chest from side to side. The diaphragm assists likewise by pressing the contents of the belly backwards, thereby enlarging the cavity. The cessation of these actions produces the return of the cavity to its original size. The reception of air into the cavity, during its enlargement, is termed *inspiration;* and its expulsion, on its contraction, *exspiration;* which actions form the function understood by the term *respiration.*

CONTENTS OF THE CHEST.

The chest being opened, by raising the sternum, there appears a smooth polished membrane attached to its upper surface, or the pleura. This membrane is there double, but unites about an inch above the sternum; and the space between the double reflection is filled by cellular substance posteriorly, or that which is very general, and contains an oily material termed fat, and by the thymus gland anteriorly: this space is called the inferior mediastinum: the two laminæ, then separating, pass over the pericardium, and over the vessels, to be reflected on the lungs. After having passed over the lungs, one portion goes over the spine on one side, the other portion over the spine of the other side; leaving in this division a tubular opening, filled by the aorta, cava, vena azygos, thoracic duct, and œsophagus. This forms the superior mediastinum. There are, therefore, two reflections of the pleura on each side; one close under the ribs, the other in contact with the lungs. A bag is formed by this reflection, but the lung is not contained within it, as is usually described, but a small quantity of water, the liquor pleuræ; and if this bag be cut into, the lung on that side is rendered for a time useless, by the air being admitted and preventing its expansion; but the distinct separation, formed by the reflections of the pleura, preserves the functions and powers of the other lung entire: without which wise provision, accidents and diseases of these parts would be more injurious, and more frequently fatal. The pleura has few arteries and veins; nor has it much sensibility, if any, when uninflamed; but under inflammation, as is seen in such states, it has a great degree of it.

MEDIASTINUM.

The mediastinum is simply the junction of the two laminæ of the pleura, dividing, by distinct partitions, the cavity of the chest. At the anterior and inferior division of the pleura, is situated the thymus gland; being under the aorta and vena cava, near to their first divisions. It appears composed of two lobes of considerable magnitude, and faintly red in the colt;

but much darker, and less in size, in the grown horse, and scarcely discernible in old age. It has been thought to be the largest in size some months after foaling; but it is now proved to exist larger in the fœtal colt previous to birth, than at any period afterwards. From this, though its use is not fully understood, it appears more essential to the existence of the animal previous to birth than afterwards. It is supplied with vessels called arteriæ and venæ thymicæ, and with nerves from a neighbouring plexus.

LUNGS.

These, when inflated, are said to somewhat resemble the figure of the cloven foot of the ox. They are spongy in their texture, being every where full of little cavities, which are the minute ramifications, or distribution of vessels termed bronchial, arising from one common trunk, called the trachea, or windpipe. By means of these vessels, air is received throughout the substance of the lungs; which, after depositing its vital part, it is returned from thence, and fresh air admitted. The lungs move freely within the chest, or rather readily obey its motions. In this they are assisted by their being divided into lobes, or separate portions; and further, by the fluid contained in them. In both the living and dead state, they leave no space between their surfaces and that of the inner part of the chest, but are always distended by the air to the capacity of the cavity.

HEART.

Between the lungs is placed the heart, supported in its situation by various attachments. It is covered by a membrane called pericardium. The pericardium first loosely invests the heart, then passes close over its surface, giving it a second covering. Between the one reflection and the other is contained a quantity of water, called liquor pericardii. The pericardium, where it loosely inverts the heart, is more dense than the pleura. It has few arteries or veins, and apparently little sensibility. Its internal surface is that which pours out the liquor pericardii. The heart is of an elliptical form; its anterior and superior part is called its basis; its posterior and inferior parts its apex. The basis is confined by vessels; the apex is loose, and strikes against the intercostal muscles, giving the pulse from the heart. It has four cavities within it; two placed in the right side, and two in the left. The first are for the circulation through the lungs; the second for that through the other parts of the body. The cavities on the right side are divided from those on the left, by a septum or partition.

Fig. 1, in the subjoined *plate* on the intestinal parts, represents such of the abdominal viscera, or contents of the belly, as appear immediately on the integuments being removed; and such of the thoracic vicera, or contents of the chest, as become evident on raising the sternum; *a a a a a*, the skin; *b b b b*, the integuments thrown back, consisting of muscles, tendons, and peritoneum; *c c c c*, the most extensive of the large intestines, called the colon; *d d d*, the ligamentous bands of the colon, drawing it into folds; *e*, one of the small intestines; *f f*, the diaphragm, a large muscle, dividing the chest from the abdomen; *g g g*, the lungs; *h*, the heart; *i i i*, the pericardium, a bag surrounding the heart, containing a quantity of fluid; it is here opened to shew the heart; *k k*, the ribs; *l l*, the sternum; *m*, the ensiform cartilage.

CAVITY OF THE BELLY.

The abdomen, or cavity of the belly, is much the largest of the three, forming, when its contents are removed, an extensive oval vault;

bounded anteriorly by the diaphragm, posteriorly by the bones of the pelvis, superiorly by the vertebræ, laterally by the ribs, and inferiorly by the abdominal muscles; so that the superior and anterior part is generally called the back, and posteriorly the loins; the lateral parts, the sides, more posteriorly the flanks; and the inferior portion, throughout its whole length, the belly. But these divisions being more properly exterior, and withal too indeterminate, it was necessary to make others, that the situation of the viscera, or the peculiar part of the abdomen affected under disease, might be more easily described; and these divisions are now generally received and made use of.

EPIGASTRIC REGION.

The abdomen is divided into four regions. The epigastric, the umbilical, and the hypogastric inferiorly; and the lumbar superiorly, which are sufficient to answer every useful purpose in the horse. The epigastric region begins at the ensiform cartilage or end of the breast-bone, and extends to within about six inches of the umbilicus or navel: within its limits are situated the liver, the stomach, the pancreas, parts of the colon, of the spleen, of the duodenum, of the aorta, and vena cava.

UMBILICAL REGION.

The umbilical region begins where the epigastric ends, at about six inches before the navel, to the same distance behind it; so that its extent is about twelve inches. It contains great part of the small intestines, the cæcum, parts of the colon, of the aorta, and vena cava, with a portion of the mesentery, and omentum.

HYPOGASTRIC REGION.

From the extent of the umbilical region, that is, six inches behind the navel, to the bottom of the pelvis, and whole posterior part of the belly, is the hypogastric region; containing the rectum, bladder, part of the colon, the iliac vessels, and parts of generation.

LUMBAR REGION.

The lumbar region is that which is situated, as it were, upon these; and is formed from the hollows left on each side of the spine, from the beginning of the abdomen nearly to the end. It includes the kidneys and their appendages, the emulgent vessels, part of the ureters, and the greater part of the spleen.

CONTENTS OF THE CAVITY OF THE BELLY.

The whole of the abdominal cavity is lined by a membrane, which is termed peritoneum; it not only lines the cavity, but invests the whole of its contents, by being reflected over them. It possesses but few vessels or nerves; when wounded, therefore, it bleeds but little, nor does it afford much pain, except under inflammation, when it becomes very sensible. It secretes a fluid of a serous nature; for the lubrication of the viscera, and for the prevention of adhesions: this may become so much increased in quantity as to cause dropsy. By its attachments it preserves the parts it invests, in their proper and true situation, which seems to be its principal use. The viscera of the belly are usually divided into three classes. 1, Those destined to convert the food into nutriment, by forming the chyle. 2, The parts concerned in the formation of urine. 3, The organs contributing to the formation and growth of the colt. The first class is by far the most extensive and numerous, comprehending the stomach, intestines, liver, pancreas, spleen, thoracic duct, omentum, and mesentery. The second class takes in the kidneys, renal glands, the ureters, urinary bladder, and urethra. The third class

comprises, in the male, the vasa deferentia, the vesiculæ seminales, testicles, and penis. In the female, the ovaria, uterus, and vagina.

STOMACH.

The principal organ concerned in digestion, or the converting of the food into nutriment, is the stomach. This is a bag whose internal surface in the horse is partly membranous and partly cuticular; in form somewhat resembling a bagpipe, but not so much in the horse as in the human subject. It is situated behind the diaphragm, across the left side of the abdomen, within the epigastric region; its right portion covered by the liver, its left by the spleen, and its whole inferior surface rests on the small intestines. The stomach has two curvatures; a greater and a lesser; also two openings, a recipient, called *cardiac*, on its left, and an expellent, named *pyloric*, on its right portion near the spine. To the recipient orifice is attached the *œsophagus*, a membranous and muscular canal, conducting the food from the mouth through the throat and thorax into the stomach; where it undergoes the necessary changes for forming it into chyle, that milky fluid which is taken up by the lacteal vessels for the nourishment of the body. The stomach in the horse is simple, having but one bag or cavity; but in many other animals it is compound or consists of several such parts, by which the food is more delayed and exhausted of the nutritious properties in its passage through the body, as has been already shewn and explained in speaking of the process of rumination or chewing the cud.

INTESTINES.

The intestines are a long membranous tract or canal, beginning at the expellent orifice of the stomach, and receiving its digested contents. They form many circumvolutions round the abdomen, and at length end at the anus. They are divided into small and large. The small intestines are the duodenum, jejunum, and ileum. The large intestines are the cæcum, colon, and rectum. The intestines are bound down to the spine by the mesentery, which is a production of the peritoneum, but the intestines have yet room sufficient for performing the motion termed peristaltic. The peristaltic motion is a gradual contraction of the intestines from before backwards, thereby expelling their contents. This force alone not being sufficient for the expulsion of the fæculent matter, nature has still farther assisted the animal with a fluid that serves as a stimulus to the intestines. This is generated within the liver.

LIVER.

The liver is a large gland situated behind the diaphragm, the greatest part in the right side of the epigastric region, divided into several lobes. It separates from the blood a fluid called bile. The bile of the horse is not contained in a reservoir or gall bladder, as in most other animals, but is constantly furnished to the intestines by means of a duct entering into the duodenum, called the gall duct.

PANCREAS.

The pancreas is a long glandular body attached to part of the duodenum and stomach, and lying across the abdomen. It secretes a fluid called pancreatic juice. Its duct enters the duodenum with the gall duct. This fluid is supposed to assist in diluting the contents of the intestines.

SPLEEN.

The spleen is a soft spongy viscus of a bluish colour, which is found to differ in size in different subjects. It is attached to the

stomach by vessels; it extends down the left side to the kidney of that side, to which it is attached. Its excretory duct has not yet been discovered, and this renders its use doubtful; it is, however, thought to assist in digestion.

KIDNEYS.

There is continually separating from the blood an aqueous saline fluid, named urine. This is effected by means of the kidneys, which are two glandular bodies, situated one on the right, the other on the left side of the lumbar region. They differ a little from each other in shape. The right approaches to a triangular form; but the left resembles, as in the human subject, the shape of a kidney bean, and is situated a little more posteriorly than the right.

URETERS.

The ureters are the excretory ducts of the kidneys, extending to the lateral and superior parts of the bladder, into which they are inserted.

BLADDER.

The bladder is a bag or reservoir for the urine. It is situated in the cavity of the pelvis; with its largest extremity towards the abdomen, and its smallest or neck towards the buttocks. When the bladder is distended to a certain degree, it contracts, and the urine is forced out through the urethra.

Fig. 2., in the subjoined *plate*, represents the two cavities of the chest and belly; with such of their contents as are immediately seen when the parts represented in the first *figure*, as the heart, lungs, and intestines, are removed. A, the stomach nearly in its natural situation; upon its surface are seen its vessels. B B B, the lobes of the liver. C, the omentum or caul, attached to the stomach throughout its whole length, covering the pancreas entirely, and in part the spleen. At one part it is held back by a pin, forced into the substance of the spleen, to shew the renal gland. D, the spleen. EE, the kidneys. F, part of the rectum. G G, the ovaria. H, the uterus or womb. I, the bladder distended with urine. K K, the diaphragm, or midriff, a large muscle dividing the chest and belly; *a a a*, the aorta descendens, seen in both cavities; *b*, vena cava descendens; it is not seen plainly in this view in the chest, therefore is not distinguished; *c c*, the emulgent veins, emptying their blood into the vena cava; *d d*, the emulgent arteries, arising from the aorta; *e e*, the spermatic arteries and veins, united by a cellular substance soon after their origin, distributed to the ovaria; *f f*, the ureters, arising from the kidneys, and inserted into the sides of the bladder rather superiorly; *g g*, the iliac vessels, being the bifurcations of the aorta and vena cava; *h h*, the cavity of the pelvis; *i*, part of the duodenum or first intestine, with which the expellent orifice of the stomach is united; *k*, the gall duct, seen arising from the liver, and inserting itself obliquely into the duodenum; *l*, ligamentum suspensorium, one of the ligaments attaching the liver to the diaphragm; *m m*, capsulæ renales, or renal glands, described in old anatomical books as deputy kidneys; receiving vessels from the emulgent artery and vein; *n n*, the œsophagus, or canal for the passage of the food into the stomach; *o*, the ascending aorta: *p*, the ascending vena cava; *q*, the division of these vessels into branches, the principal of which are *r r*, the subcostal arteries cut off, furnishing with blood the fore legs; *s s*, subcostal veins cut off, returning the blood from the fore legs; *t t t t t*, jugular veins, returning the blood from the head; *u u u u*, carotid arteries, carrying blood to the head; *v*, a pipe, supporting these last vessels,

to render them more distinct; *w w*, the trachea or windpipe; the portion entering into the chest is removed; *x*, the œsophagus or gullet, brought from its situation behind the trachea, and supported with a knife; *y y y y*, the integuments of the abdomen thrown back. See *plate.*

The means by which the prevention and cure of the various diseases to which the horse is subject having been thus explained, and the skeleton, muscles, and different viscera or internal parts of it minutely described, we may proceed to the uses of the several parts.

SECTION XI.—*Different purposes to which the several parts of the Horse are appropriated.*

ALL the parts of the horse may be rendered useful by some sort of beneficial application or other.

BLOOD.

This is of much use for the purpose of manure, in the same way and under the same methods of preparation as those which have been proposed for that of neat-cattle and some other animals. There is, however, in most yards and places where they are killed as food for other animals, a very great loss and waste of this material, as well as that of the excrementitious kind, in consequence of not having proper receptacles and places formed for holding and improving such matters; as from their running about and being spread out over such yards and places, much is lost by evaporation and a variety of other causes, and vast disadvantage as well as inconvenience sustained that might be avoided. In all such yards there should, of course, be places properly made in the lowest and most inclining parts of them for receiving and containing all such liquid and other waste substances, which, by being drained and swept into them, would turn to much benefit and advantage; while, for want of such contrivances, there is a loss incurred that might by such means be converted into profit.

BONES.

These are generally turned to the best account, by being broken and boiled for the purpose of having oil drawn from them; and they are also useful as manure in the same manner as those of neat-cattle, though not quite so beneficial in consequence of their containing a less proportion of the oily material. They are likewise used for manufacturing purposes, in the same manner as those of neat-cattle, and for some articles they are found to be rather more useful and proper.

They form a material of a very considerable importance in many large towns in different parts of the kingdom, where the destruction of horses takes place in great quantities; and their amount in the metropolis is scarcely to be calculated, in consequence of the vast number of horses that are there continually killed or destroyed and carried to neckers' yards.

FLESH.

The flesh of the horse is not lost, as it supplies the food of many sorts of our small carnivorous quadrupeds, such as the dog, cat, and some other kinds, for which no small amount is annually paid in various situations, as the cost of it is proportionately very high; and it causes also a great national saving in other sorts of valuable meat, which must otherwise have been made use of for the same purpose. It is still further of use by yielding employment to many in different ways, by its provision, preparation, and sale in the large as well as in the small way, from which considerable benefit is derived. Thus the flesh of the horse is not by any means to be considered as useless.

HIDE.

The hide of the horse, after being tanned or otherwise prepared, furnishes leather for boots and other uses, of the more strong and stout kinds; and is applicable in a variety of purposes, where the finer sorts are too expensive or of too little strength. The parts or pieces about the heads and towards the hoofs are formed into glue; and the cuttings and clippings, and other such small waste parts, are, when in quantity, converted to use as manure on many sorts of the more light dry kinds of soil. Wherever cheapness and strength are required, horse hides may be had recourse to with more benefit than those of some other kinds.

HAIR.

The short hair produced in the neck and tail of the horse is partly used in stuffing chairs and seats of different kinds, and partly twisted into ropes for clothes' lines, and hopples for cows, and some other such applications; but the long hair of the latter part is employed for different finer purposes of many sorts; where of sufficient length and goodness, for fishing lines of several kinds, and for other purposes in which the effects of water are to be counteracted.

Horse-hair is, of course, a material of much value, utility, and importance, in different respects, especially where strength is wanted and wet to be guarded against.

HOOFS.

The hoofs of the horse, besides being made use of as a manure, are much used in the process of making prussian blue, being a cheap animal matter for that use. These are probably the chief ways in which this material can be applied to any benefit; and in the former of them, the effect which is produced is of but very little duration; it, therefore, will not be used as manure where other more lasting animal matters can be procured.

DUNG AND URINE.

The dung of the horse is better and more forcing than that of any other of our domestic animals; most probably in consequence of the quality of the food used by it, being of so greatly a superior kind, and the quantity so much larger, than that which is commonly eaten by other sorts of live-stock; and also by its not having to undergo the ruminant process, by which dung, in many other cases, is so much lessened and deprived of its more rich and valuable properties. It likewise more quickly decomposes, and takes on more heat than any other sort of dung, and thereby becomes so much more fit for the production of garden vegetables as well as some of those of the field kind. It is from its superior warmth and stimulating qualities, in consequence of the above circumstances, that it is so much more proper than other kinds, in forwarding vegetation by its forcing powers. And for the same reason, it becomes so much more fertilizing and efficient than most sorts of dung in field culture. The food of the horse, in consequence of his not chewing the cud, or having a ruminant stomach, passes through the bowels without being wholly robbed of its nourishing parts. Thus sparrows may often be seen to pick up the grains from the dung that has passed through the horse, and which are still in a state to nourish and support them; but such is never the case with the dung when it has passed through animals that have ruminant stomachs. This point has, however, been fully explained in considering the dung of neat-cattle.

The dung of the horse on these accounts should therefore be used in most cases of field cultivation before it becomes in too reduced or

rotten a condition, as it will then be found to go much farther and last much longer, which are objects of much importance. The urine of the horse will be found beneficial in the manner that has been stated under the head Neat-cattle.

Chapter VI.—LIVE STOCK.

THE ASS.

Section I.—*Nature, Circumstances, Uses, and Manner of raising.*

This is an animal of the horse kind, which is now well known in most countries as being very useful for many purposes of different kinds, in consequence of its great hardiness, requiring little attention in dressing, and being easily kept and accommodated. From the nature of its step and power, it is, however, wholly unfit for field labour of almost every kind.

It is described by naturalists as having long slouching ears and a short mane; the tail covered with long hairs at its termination only, and the body in general of an ash colour, with a blackish bar across the shoulders. Its hoof consists of one piece, and it has six cutting teeth in each jaw. But the colour may vary and be different from the various casts of the mouse to that of a brownish black, and there is mostly a black line passing along the back as well as across the shoulders; but in some instances both are wholly wanting.

TEETHING.

The ass, at the age of about two years and a half, has the first cutting middle teeth dropping out; when the others on each side soon do the same, and the whole are replaced in the same time and order as those in the horse. The age of the ass, too, is known by the same marks in the teeth as those in the horse.

APPELLATIVES OR USUAL NAMES.

Those of the young ass are *male* or *female ass foal* for the first year, then *ass colt*, *young* or *female ass*, and *Jack-ass*, or *female ass*, ever afterwards.

ORIGIN.

The domestic ass seems to have originated from the wild ass, which is a native of Arabia and other warm parts of the East, and to have been gradually introduced from thence into this and other European countries, where it has diminished in size in proportion to the coldness of them; as foreign asses and those of warm parts of the globe are much larger, handsomer, and better made, being very useful animals in many cases, and for different uses and purposes.

BREEDS, RACES, OR KINDS.

There are two breeds, races, or kinds, of the ass, one of which is more bony, clumsy, heavy, and slow in its movements than the other, being proper for carrying weighty loads, and other such uses; while the other is better made, more light and nimble, with much greater facility in the movement, and more fit for the purpose of riding. The former in this country is more frequently of the lighter cast of colour; but the latter is mostly of a blackish appearance in the nature of its colour; though there are

asses of all such colours that are large, inactive, and clumsy; and others, again, that are light, nimble, and of great agility; yet, in general, the dark sort is more usually of the nimble kind, and more fine, sleek and glossy in the skin or hide than those of the other kinds of colours.

BREEDING.

In breeding asses, more strict attention is necessary than is usually bestowed in the selecting and putting together such of the different kinds, both male and female, as are the most properly formed and suited for the purposes for which they are designed. Where the working sort is wanted, those of each sort should be chosen which have the best suitable shape and size, with the most proper strength of bone and muscle, as in the team horse; but where the riding kind are to be raised, such males and females of the lighter and more nimble kind should be provided as approach most to the form of the well-made road horse, which are mostly those of the darkish cast and most lively disposition.

In the practice of breeding with these animals it is the best way to have the male put to the female towards the end of the spring after she is three years old, and not to let her have more than one foal in succession at a time, being careful not to work her too much while with foal, and constantly keeping her well. The foal, after some time, should be tied up for a few days, when grass or other proper food should be given it, and then be turned out into a proper pasture, feeding it there when necessary.

WEANING, REARING, AND MATURITY.

The foal, when it has been kept with the mother for from four to five or six months, may be weaned; in doing which, it should be kept alone and be well supplied with food.

While rearing, the ass foal should be constantly provided with better keep than that which is commonly given it, in order to be raised in the best manner and to the greatest perfection; but most sorts of coarse food will serve the purpose of it, if good of its kind, and supplied in a sufficiently full proportion. While in the rearing state, the hoofs of the young ass are liable to get much out of form, growing long and turning up at the toes, so that there is but little sole to tread upon; it would therefore, in all such cases, be useful to keep them in proper order, by paring and rasping them as there may be occasion.

The young ass becomes perfectly reared and of full growth about the third year of its age, when it becomes fit for the different purposes for which it is intended. It should not, therefore, be put to much work before that time, as when that is the case, it is often greatly injured thereby, and rarely comes to so full a growth and perfection as would otherwise be the case.

BREAKING AND TRAINING.

Towards the time the young ass has attained its perfect state, it may begin to be trained and broken in for the several uses to which it is to be put. If of the labouring kind, it should be so trained as to be made to step out more fully and perfectly than is the common habit of the ass, which will render it of much more use and value, in every intention. If for the purpose of riding, it should be properly trained and broken in for that use, by being frequently mounted and ridden upon, so as to gain good paces, and be made perfectly tractable and free from every kind of obstinacy and restiveness to which asses are so subject.

USES.

In all cases where the ass has been attempted to be employed for team labour in the field, it has generally been given up, being found in its

step and want of power to be wholly unfit for such work; as three asses have not much more power in performing such business than one strong horse, while their movement is much slower, it would, therefore, require them much in that proportion to execute the work of a team of two horses of full strength. They have, also, other inconveniences and disadvantages for such labour, as they are liable to go astray, and be out of the way when wanted, and are very destructive in cropping the young hedges both of the thorn and other kinds. But still they are of considerable utility about the farm-house, for doing various little jobs of carriage work; for carrying fuel, sand, and charcoal, in many hilly situations, as the ass can carry more weight, in proportion to its size, than many other animals; and they may be used for cutting chaff or churning. The riding sort, as being easy in all their motions, sure-footed, and convenient for mounting, may be beneficial for learning youths to ride, and have lately been used for ladies taking exercise in the open air, the most proper sort for which purposes have been already noticed. For the great variety of the different uses and intentions of the itinerant dealer, the ass is almost invaluable, on account of its steadiness, its domestic qualities, hardiness, and moderate habits of feeding and lodging.

DISEASES.

The diseases of the ass are few, and partake much of the nature of those of the horse. Though fed in a more natural way than that animal, they are subject to some of the same complaints, as those of the glanders, and bowel kinds, with a few others, which are to be removed in the same manner as similar diseases in horses, only using the different remedies in about the third of the quantities that are employed for that sort of animals.

The ass is very little troubled with lice or vermin of any kind, probably from the dryness, hardness, and closeness of its skin, which renders it a still more pleasant and useful animal.

SECTION II.—*Different Applications and Uses of the several Parts and Substances.*

THESE are employed in many different ways, and for a variety of separate uses and applications.

FLESH.

This may be made use of in the same manner as that of the horse, and is probably equally good, or better, for all such purposes; as in some countries the flesh of the wild ass is considered a great delicacy.

SKIN.

This is applicable to a great many uses, in consequence of its hard, coarse, dry, and elastic qualities. It is employed for making sieves, drums, vellum, and pocket-book parchment. And shoes made from it, when tanned, are said to be the most durable of any. The waste parts, when properly prepared, likewise, make a fine and excellent glue, as well as a size of superior quality.

BONES.

These are very hard, and used for many purposes, and the waste parts of them are serviceable for manure.

HOOFS.

These, as in those of the horse, are used in the making of prussian blue, and the refuse as a manure, with the other bony and horny parts.

MILK.

The milk of the ass has long been in high esteem, for its efficacy in the cure of consumptive cases. The ass for this purpose should be young and healthy, have plenty of good food,

and be without the foal, being fed alone. The milk should be used before it gets cool, and be as little exposed to the action of the air as possible. In this point of view, the ass is important and valuable; as the charge in the metropolis, and some other large towns, is usually about a guinea for the month. Asses that are in the fresh state of milk are always to be employed in this intention, as affording the best milk.

DUNG.

The dung of the ass is useful as a manure, in the same way as that of the horse, but it is less rich, strong and forcing, in consequence of the less nutrient and more coarse sort of food on which it is usually fed.

Chapter VII.—LIVE STOCK.

THE MULE.

Section I.—*Nature, Circumstances, Kinds, raising, managing, and Use.*

This is a hybrid or mongrel animal, the best kind of which is produced from the male ass and the mare; but an inferior sort, which differs in some respects, is raised from the horse and the female ass. The mule has, of course, in some measure, a mixed nature, possessing properties or qualities between those of the animals from which it has originated, but mostly inclining somewhat more to those of the male than female. Those raised in the former manner are more fine and large; and those in the latter, smaller and less valuable. In its form, the mule is thick in the head, has long ears, is straight and upright in the shoulders; the neck is short, the back long, the rump short, the ribs flat, the belly rather deep, the legs short but good, and the feet small and hard: height mostly from twelve hands and upwards; having a darkish colour, with but little hair on the mane and tail, as in the ass, from which it differs in no great degree, only in having considerably more power, so as to approach that of the horse.

TEETHING.

This, in these animals, shew the age, the same as in the parents, the mouth being formed exactly in the same manner, as to the teeth, and they display the same marks.

APPELLATIONS, OR USUAL NAMES.

The young of this kind are simply known by the names of *male* and *female*, or *filly* and *male foals*, for the first year; and ever afterwards by those of male or female mules.

BREEDS OR KINDS, AND BREEDING.

The breed of mules should be raised of two kinds, one for work and the other for riding.

In the breeding of mules, wherever it is well practised, attention should constantly be paid to select such as are of more weight and strength, or more light, nimble, and active, as they are designed for purposes of working or of riding.

To accomplish the breeding of large mules of the first kind, the largest and strongest sort of male asses should be selected, such as are of the best draught size, being of the best make,

large and well formed in the body, properly small and good in the limbs, the head not too large, the breast as good as possible for draught, and not too old.

In the breeding of the latter, or the riding sort, the asses should be of the more light, nimble, and better formed kinds, and the mares of the best shapes, in the whole of their different parts, with perfectly good movement or action. In the raising of mules, it is of much advantage to have the mothers well kept before and after the foals are dropped, while they are sucking, and when weaned they should be reared in a tolerable good manner, in regard to food, be well sheltered in the winter season, being turned out daily for exercise. The mule is capable of being put to use at the age of three years, but does not reach perfection until some years afterwards.

In the raising of mule foals, it is beneficial to have them often handled, as it renders them more gentle, and free from kicking, and bad habits and qualities, as well as more manageable in every way.

REARING.

In the rearing mules, care is necessary to see that they have no want of the less fine and rich sorts of keep; but when too fully fed with the best kinds of food, whether grass or fodder, they are apt to become afterwards too nice in their appetites. They should always, however, have a sufficient quantity of the more rough and ordinary sort, to keep them up in a good thriving and growing condition, without causing them to be in too full a state of flesh. It is proper that they be not too much sheltered, as one of the main and great points to be aimed at in their rearing is hardiness; but a little protection, in some cases of very severe cold or very wet weather, may occasionally be useful and requisite.

BREAKING AND TRAINING.

Where these animals are raised, they should be broken and trained, for their different uses, in the manner of the horse, which may be done partly as they advance in their growth, so as to be finished when they are about three years old. They should not be put to full work before they are four, as there is less risk incurred at that age of their sustaining injury, and being restricted in their full and perfect growth. In breaking them in for labour of any kind, as well as in the previous rearing and training, every possible care should be taken that they do not acquire bad or obstinate habits, which they are very liable to do, when not well attended to.

USES.

These animals are found to be greatly useful in the work of warm countries, where the roads are rough, steep, and rocky; they are so sure-footed, and so proper for conveying large loads, their nature is so hardy, their capability of living on very little and coarse keep, and of enduring great fatigue, are so remarkable, that they may be considered among the most valuable on many occasions.

There are many sorts of labour for which it has been supposed that they might be had recourse to, in this and other less warm countries, with more profit and advantage than the horse. But this notion cannot be well founded, for it must be evident, that mules can never be so suitable for any purposes to which working horses are usually applied in this country. In warm countries they are better adapted than horses to the work and treatment to which they are exposed, from their greater hardiness, their more passive nature, and from being able to subsist on coarser and less costly matters as food. They are also better able to bear the excesses of heat and cold than any sort of horse,

even than that of the race kind; but their introduction here can' have no possible chance of profit or advantage, either to the breeder, the employer, or the country.

The breeding and raising of a few mules may, however, be found to afford a slight profit, and, in some intentions, they will be preferable to the horse from their greater hardiness; for instance, in conveying charred coal from the woods in some mountainous situations, to iron and other works of a similar kind. They will, it is said, carry three-hundred weight, and follow the labour in succession every day in the week for the whole of the year round, which has been found to be too much for a horse to perform. Mules are also more durable and lasting under such severe exertion, as they will continue it for five and twenty years, while horses are rarely found to continue under it longer than twenty at the most.

DISEASES.

These are, in a great measure, the same as those in the horse. Mules are, however, rather more subject to those of the griping bowel kind, in consequence of the more coarse, hard, and acrid nature of their food or keep; but far less to those of the feet, and some other parts. The proper remedies and means of operation, in all cases, will be the same as with the horse, and there will be but little, if any, difference required in the quantities of the medicines that may be used.

DIFFERENT APPLICATIONS OF THE SEVERAL PARTS.

Although the blood, bones, hoofs, flesh, hide, hair, dung, and urine of mules, are much the same as those of the horse, some of them are less valuable in their qualities, as the animals are less richly and fully fed and supported than the horse; and this is the case, especially, with the flesh and the dung, neither of which are equally good or useful with those of that animal, in consequence of the inferiority in the nature and quality of the keep on which they live. They are both, however, capable of use in their general applications, and the latter, probably, with more benefit than the dung of many other sorts of animals, particularly those of the ruminant kind. In the hair there is also an inferiority, being of less length, and more coarse and hard, in consequence of the nature of its origin; but it is small in quantity, and, therefore, of but little consequence.

Chapter VIII.—LIVE STOCK

HOGS OR SWINE.

Section I.—*Nature, Circumstances, Character, Advantages, and Uses.*

These are animals which appear to have a sort of middle nature between such as are graminivorous, which feed on herbs and grass, and those which are carnivorous, and eat flesh, possessing, in some measure, the distinguishing circumstances that are peculiar to each class. They are very numerous in their kinds, having spread and extended themselves to most parts of the globe, though they are said not to have been originally found in America, but to have been transported thither by some of the first settlers in that country. In some

places, where they have increased rapidly, they have become again in the wild state, but with shorter bodies, and more thick in the snout parts as well as in the skin.

These form the principal animals of the second or smaller division or class of Live Stock, and are of considerable profit and advantage in certain situations and descriptions of farm lands; such as those of the arable and dairy kinds, though a few may be kept with benefit on almost any sort of farms, as they live much upon the various kinds of refuse materials, that can only be used for such purposes. The hog, which is a name generally applied to animals of the swine kind, may likewise be kept with much utility in various kinds of manufactories, where large quantities of grain are made use of, as in those of the starch kinds, and in distilleries and breweries.

There is evidently much diversity in these animals, in different situations, and under different circumstances, which in this, as well as in all other sorts of live stock, should be particularly noticed by the breeder, keeper, and farmer, in order that he may have a good breed, which will constantly pay better than an inferior kind. Like most other descriptions of farm animals, they, in some measure, require to be adapted to the nature of the keep, and the circumstances of the management under which the farm is conducted. They should constantly possess, as much as possible, the chief marks and properties of good hogs, which are those of the form or shape, the nature of the ears, and the quality of the hair. The pendulous, hanging-down, or lop ear, and the coarse harsh hair, indicate largeness of size and thickness of skin; while erect or prick ears show the size to be smaller, but the animals more quick in feeding. Smooth, soft-haired hogs are most suitable for warm climates and places.

These animals have been stigmatized by many, who seem to know but little of their real nature or habits, with being extremely filthy, and of an impure nature; but the fact is the very contrary; as they are particularly fond of cleanliness in every thing, though they may, like animals of the cattle kind, sometimes indulge, in hot weather, in wallowing in miry, dirty, and stagnant waters, for the purpose of cooling their excessive heat. Their stomachsare wellsuited by nature to the reception of a great number of substances that are nourishing to them, which, in other circumstances must have been wasted or lost, as the various refuse matters of the dairy, the kitchen, the garden, and the field, as well as some others. The nature of the form of them is extremely well fitted to the manner and habits by which they provide their food, being lower in the make than many animals, with a greater strength and thickness in the neck, the snout, and the length of head, so as to turn up the ground readily in procuring different sorts of roots, and their smell is acute, by which they have the power of readily discovering their proper food. Their natural inactivity and heaviness render them capable of speedily taking on flesh and fat, which is so laid on as to form a thick and regular lair on the surface of the flesh towards the skin. These animals seem to have a forboding or sort of fear of bad weather setting in, as before which they are restless; and, in the time of high winds, are often much disturbed, running about in a hurried manner, and screaming very disagreeably, at the same time carrying straws in their mouths to their habitations, and preparing, as it were, against such storms and impending bad states of the weather.

The flesh of these animals, especially when in the tamed state, is very fine and wholesome, being easy of digestion. It is, of course, of

very general use in many different ways; and for salting it has many advantages, as it takes the salt better and more readily, it keeps longer than most other sorts of meat, and, consequently, is of vast utility for shipping and various other such uses.

Swine are capable of living to the age of twenty or thirty years; but this circumstance can rarely or ever be ascertained in this country, as they are mostly killed while young. In the ordinary management of swine, sows, after they have had two or three litters of pigs, are generally killed; but no breeder should part with one whilst she continues to bring large litters, and to rear them with safety, although custom often induces the farmer to kill such sows, and to substitute others of not perhaps half the value in their places.

The characteristic distinctions of the hog, as given by naturalists, are, that there are four front teeth in the upper jaw, which are converging. In the lower jaw, six, which are projecting or prominent. Two canine teeth or tusks in the upper jaw, which are rather short; in the lower jaw two long, exserted or standing out. The snout truncated, prominent, and moveable. The feet, for the most part, cloven. It is a sort of animal, in some points, of an ambiguous nature, being allied to the *pecora*, or cattle, by its cloven hoofs; and to the *feræ*, or wild beasts, in some degree, by its teeth, yet differing widely from both in many respects. It is, consequently, supposed by some, to form at once a link between the cloven-footed, the whole-footed, and the digitated quadrupeds.

It is asserted by some naturalists, that swine are not indigenous to these islands, but probably without sufficient authority; they are no longer found wild either in this country or in France.

APPELLATIVES, OR USUAL NAMES.

The male hog is called a *boar* or *brawn*, until castrated; then a *hog*, *pig*, or *gelt pig*; the female a *sow*; when cut or spayed, a *gelt* or *gaut pig*; and a young one, a *little pig*, or *sucking pig*.

It is very usual, in the more northern parts of the kingdom, to term all pigs in common hogs; but, in the more southern parts of the island, *shots*; and, after the time of weaning, the term *pig* or *swine* is commonly used in every district.

TEETHING.

The hog does not, as in most cases of other animals, shed or lose the fore or front teeth, and put forth a new, or have another set substituted in their place, but continues those it first gets through the whole of its life, so that the teeth afford no marks or signs of its age, but this is determined by the state and appearance of the animals in the several stages of their growth.

ORIGIN.

The wild boar of the woods and mountains is without doubt the source or common parent from which all the various domestic kinds of these animals have been originally derived, but which is greatly smaller than those sorts which have undergone the state of domestication, probably in consequence of their being less plentifully supplied with food. It does not vary in colour, like that of the domestic hog, but is, for the most part, of a brindled colour, or darkish gray, somewhat inclining to a black cast. The snout is longer, the ears more short, round, and blacker, than in the domestic sorts. There are also very large tusks in each jaw, which serve as a sort of defence, as well as for providing their food, which is principally of the root and herb kinds; those which are situated in the upper jaw are turned upwards in a circular manner, and are extremely sharp

in the point parts, but it is those in the lower jaw that are most to be apprehended, as by them the animals not unfrequently inflict very severe wounds, both in the wild and tame states. These wild hogs are not inclined to herd together, but in the young state they form themselves into their several families by way of better protection. When they have reached the state of maturity, they mostly pass the forest in a solitary manner, and without any sort of fear of being overpowered, seldom turning out of the right-forward tract, but without ever making any attack on other kinds of beasts, though well prepared for it when necessary.

The wild European boar, which, as seen above, is the original stock of all our domestic breeds, is still to be found in the forest parts of Germany and other countries on the Continent, being generally preserved as a beast of chase. It has a dark brindled, gray colour, sometimes nearly black, or of a dusky yellow, with longitudinal stripes, like those of the domestic kind, which are frequently called *corderoy* pigs; it is a smaller animal than the tame hog, with more upright wide ears, longer and more powerful snout, large head and shoulders, higher crest, deeper and shorter in the body, thinner in the hinder quarters, and endowed with considerable activity and strength.

Section II.—*Foreign Breeds or Kinds.*

There are, in other countries, a number of different sorts of hogs, either in the wild or more tame and domestic states, such as the following:

African, or Cape Hog.

It has its habitation in the hottest and most uncultivated parts of that trackless region of country. It is a very active and vicious kind of hog, being very swift and dangerous in its attacks, advancing with much fury, and destroying its prey instantly, by breaking the legs and ripping up the belly almost at the same moment. It has four tusks, the two which proceed from the upper jaw are very large, and turn upwards somewhat in a horn-like manner. They are eight or nine inches in length, and more than five inches round at the bottom part. The two other tusks, which come out from the lower under jaw, have not more than three inches projection from the mouth. These are their weapons of destruction. The colour of them is of a bright yellow cast, as in some of the tamed sorts. The nose is broad, flat, and of a horny hardness. The head is very large, and the snout long and slender, in proportion to the magnitude of the body; the tusks large and very hard; below the eyes there are great lobes or wattles, which are placed in a somewhat inclining manner; they are broad, flat, and rounded at the ends, being so situated as to prevent the sight of any thing that may be directly underneath them; the ears are large and sharp, narrow and erect at the points, being lined with long hairs of a whitish cast on the insides; the tails are flat and slender, (the animal constantly holding them in an erect position when under pursuit,) and they terminate in a tuft about the highest point of the leg; in the jaws there are altogether twelve grinding teeth.

These hogs live in holes formed in the ground, the passages to which are extremely narrow and confined, from which they rush unexpectedly upon their prey. When closely pursued, they frequently take up their young in their mouths, and run with much expedition. In consequence of the shortness of their necks, they often feed in a kneeling position, quickly changing it, at will, to that of standing. Their

flesh is of a good quality, and has much the flavour and appearance of the common hog in its tamed state. They are covered all over the body with fine long bristles. They abound greatly in the vicinity of the Cape, and at the De Verd islands. They are red or sandy in colour; they are small in the head, with long, slender, pricked-up ears, soft and short hair, and a long tail touching the ground; but whether this be the same breed or variety as that used in this country as a cross, under the same name, is not by any means well ascertained.

This sort has sometimes been confounded with that below, but it differs in the form of the head, the structure of the mouth, and the manner in which the body is covered and protected.

CAPE DE VERD HOG.

This is another African variety, which is also large, and much longer than the former kind.

ETHIOPIAN HOG.

This breed or variety of the hog has no front teeth; and underneath the eyes there is a kind of soft wrinkled bag or pouch. These hogs are inhabitants of the Isle of Madagascar and the more hot parts of the African territory, having spread themselves over the whole of it from the more southern parts to those of the north as far as Congo. The habits and economy of this animal are but little known; but, like the former sort, they are supposed to live mostly under ground, where, from the form and texture of their snouts, they are capable of making their way with the same ease as the mole. It is nearly five feet in length, and from two to two and a-half in height; the body is thick and broadly made; the snout part somewhat horny; the mouth narrow, as well as the teeth; but the gums are very hard in order to supply their use. The tusks in the lower jaw are small, while those in the upper are very large. The skin is of a dusky cast; the bristles are thinly dispersed in a sort of patchy manner over the whole body, being longer between the ears and on the shoulders than on any other parts of the body.

GUINEA HOG.

This hog is black and bristly on the hind parts, and has the tail reaching quite to the ground. It inhabits the above tract of country. It is less than the common domestic hog. The tail is naked; the ears are long and pointed; the body is red in colour; and the hair longer on the head and buttock parts than any where else. There is a variety of this animal which has erect ears, a little pointed, with the tail reaching nearly to the ground.

MEXICAN HOG.

This sort of hog has on the back part a sort of glandular orifice; it is without a tail; the tusks of it are scarcely seen when the mouth is in the close state; the ears are short, erect, and pointed; the eyes are sunk in the head; the neck is short and thick; the bristles are large and stiff, the largest being on the neck and back; the colour almost black, mixed with rings of white, and from the shoulders to the breast there is a collar of white. In its figure and size it somewhat resembles the China hog. A thin fetid fluid constantly keeps up a slight dribbling discharge from the glandular opening on the back, which is an extraordinary peculiarity in this sort of hog. The habits, instincts, means of defence, and economy, of these hogs are not very materially different from those of the European and other hot climates, but they are far more gregarious. They abound greatly in the hot South American districts. They make a loud grunting noise; they live in woods and forests, but do not

become fat like the common tame hog. They devour many kinds of reptiles with great avidity. They are equally productive in bringing forth their young as the domestic hog, which they rear with great care; and, though they exist in the wild state, they are domesticated or tamed without difficulty. Their enemies are numerous and very destructive, which circumstance keeps them from abounding too much. Their flesh, when carefully kept clean from the glandular discharges, by washing, and by having that part removed before they are killed, is very excellent and pleasant as food; but it is more dry and lean than that of the domestic hog. These hogs have never been known to breed with the common hog, though frequently intermixing with them in different parts, where both much prevail.

BOSNIAN AND SERVIAN HOGS.

These hogs, with which the markets of Vienna are much supplied, have the character of being at once the hardiest and the handsomest in the world, and such as will stand travelling with the least waste of flesh.

The hogs of France and Germany are mostly of the large smooth-hided, heavy-eared, breeds, resembling the old breeds of Yorkshire and Shropshire, with longer legs, and of still worse form. The hogs of the parts about Cardistan, in Asia, are of the largest size and weight; and Aristotle and other ancient writers have mentioned a peculiar variety of swine, which was common in Illyria, and which do not divide the hoofs. It is believed that the whole footed breed existed at a former period in this country in the neighbourhood of Windsor, and that they were a large and superior sort of hog, some remains of which variety are still occasionally found.

BATAVIAN SORT.

In the island of Batavia the tonkey hog, or short cross, has long been reared, from which we have probably derived the large thick-hided *tonkey hog*.

PORTUGAL SORT.

This sort, which is nearly of a similar form with the Chinese, is probably only a variety of that breed.

SECTION III.—*Domestic Breeds and Kinds of this Country.*

ALMOST every county or district of this country is in possession of a particular *breed*, variety, or kind; but all these numerous different sorts may be distinguished into the smaller or porking kind, and the middling-sized and large bacon kinds.

The following are the most valuable breeds or kinds of the different sorts, which are generally named after the districts or places wherein they are bred or raised. In each of these there is some peculiarity, sufficiently interesting or useful to render a description of them in a work of this nature absolutely necessary:

Smaller Breeds or Sorts.	*Larger Breeds or Sorts.*
White Chinese,	Berkshire,
Black Chinese,	Hampshire,
Mixed Black and White Chinese,	Shropshire,
Blue and Sandy Chinese,	Gloucestershire,
Norfolk,	Herefordshire,
Suffolk,	Wiltshire,
Kentish,	Northamptonshire,
Essex,	Leicestershire,
—— Half-bred,	Lincolnshire,
Sussex,	Yorkshire,
Devonshire,	Warwickshire,
White English,	Worcestershire,
Swing Tail,	Oxfordshire,
Scotch.	Cheshire,
	Rudgwick,
	Woburn,
	Irish.

SMALL SORTS.

In these there is a convenient diversity in many points, circumstances, and particulars, of their nature and properties, that render them profitable and beneficial in different situations.

CHINESE BREED.

This breed is distinguished by the neck being thick; the body very close, compact, and well formed; the legs very short; and the size small; the flesh delicate; the colour various,—as black, white, brown, and tawny. It is a breed which is particularly disposed to fatten in an expeditious manner, and has, in consequence, spread over a great part of the kingdom. It is most adapted for pork, as it is much too small for bacon. It is mischievous when not well rung. There are a great many kinds of these sorts of hogs, that vary very materially in their forms as well as colours, and some other particulars; but it is probable that the black kinds were the original breed. The white sort are, however, preferred by many, and on that account they may be the first considered.

WHITE CHINESE BREED OR SORT.

This is a very perfect sort of hog, having a high degree of whiteness in the hairy coat that covers it as well as in the skin, the former being very thinly dispersed over it with but few bristles in any part; the ears are well placed, and of the prick-up kind, of a good shape; the eyes are bright, and rather too sparkling, bespeaking a sort of wildness; there is a fulness in the carcass, with a fineness in the snout,—but, in some cases, these hogs are very nice in being reared. They are, in general, used for cutting and roasting, but are inclined to be too much loaded with fat for such uses, wanting a sufficiency of lean flesh. The sows are sometimes rather bad nurses; but this is far from being generally the case, though, from their great disposition to fatten, they sometimes decline too quickly in their milk after having their young. In the mixed sorts, the pigs are commonly beautiful in their forms, with a great propensity to fatten expeditiously on little food. The hogs of the true breed of this kind, when in the fed state, at the age of about a year and a-half old, will weigh from ten to twelve stones and upwards, and at two years from sixteen to eighteen stones. The breed, however, is objected to by some farmers on account of its fattening too much.

There are white sorts of these hogs with dark or sandy-casted heads, which are very similar to those just described, only the head part is less broad in the front, and the ears are handsome and better set on. They are a well-formed and handsome kind of hogs, having, probably, been rendered larger by crossing with better-sized suitable kinds, by which they have become more fleshy with less fat, and are better for the purpose of bacon. In common, they weigh rather more than the above kind.

There is, likewise, a small close-made white sort, which is very perfect in its form, but which is apt to become much too fat when too long fattened for the purpose of good eating-pork, much loss being sustained by the over quantity of fat being cut away by the butcher, as the lean they contain is very small in proportion to the other part. They are fine in the bone, the legs rather short but good, and the whole of their several parts equally small, their height seldom being more than about a foot and a-half, and their weight not more than seven or eight stone. They may, however, in some cases, be found useful for the purpose of cutting as roasting or pickling pork when not fed too highly, as they have a quick aptitude for taking on fat on little food; but they cannot certainly furnish meat in equal proportion to the larger kind of hogs. They are wholly unfit for the purpose of bacon. This sort of hog is particularly distinguished from the common kind by having the upper parts of the body

nearly bare, the belly descending almost to the ground; the legs quite short, and the tail still shorter in proportion. This sort abounds greatly in China, has spread itself much in the different South Sea Islands, where it is very abundant; but it has undergone vast improvement since its first introduction into this country.

BLACK CHINESE BREED OR SORT.

This is, probably, by much the most thriving sort of pigs of any that are yet known, though much too small for most general purposes; yet they are certainly capable of affording, in any given time, a larger proportion of human food, at a less expense in the keep, than any other sort that can be employed for the purpose.

This is a sort of hog of the Chinese kind, which is less perfect and handsome in its shape than the white sort, and generally of a perfectly black colour, except in the face, which is often bald. They are more hardy in their nature than the other sorts, and make better and more attentive and useful sows for the purpose of breeding. In some cases they are not so well formed about the head, the fore part of which has rather too much breadth, and the ears stand somewhat too wide; they are of more length in the carcass part than the white, and have a greater length of leg; the hair of the coat is usually fine, with a fineness also in the flesh, and a thinness in the rind or skin of the meat. They have the property, too, of quick growth when properly kept, and are, upon the whole, good hogs for the purpose of roasting and pickling pork. They usually weigh, at a year and a half old, from ten to twelve stone or more, and are much met with in Yorkshire, and some other of the northern districts, as well as in several parts of the southern pig-breeding counties.

There is another kind of the black sort, which is of a larger size, and very perfect in the form of its several parts, as well as the whole hog; but it is probable, from the largeness of such hogs, that they are a mixed breed or sort. They are an useful sort of hogs, as being sufficiently large for use as bacon, with quick growth, and a readiness in becoming fat without being great consumers. They have been introduced into Ireland with great success.

There is also a small kind of the black sort of this breed, having much perfection in the form of the animal, as well as in many of its more useful qualities; but they are small, and liable to become too fat, having the disposition of expeditious fattening on ordinary keep, like all the Chinese sorts. They are capable of being considerably increased in size and bettered in their flesh and some other properties by crossing with a larger sort. The weight of the true breed is about six or eight stone at a year old; and in the mixed kind, ten or eleven stone at a year and a half. The black, small, nearly naked sort, large bellied hog of the Chinese kind, as well as the white, has long been well known in this country as a cross for giving fineness of bone and quickness of proof in the breeding and fattening of hogs of such small sorts.

MIXED, BLACK AND WHITE CHINESE BREED OR SORT.

This is a sort which is variously patched on different parts with black and white, but not confined to any particular part of the body or other places. In this sort the head has somewhat an improper form, being too hollow, and short in the face part, with an over-breadth of snout, wide in the mouth and fore part of the head, which is coarse; the ears are large and

somewhat wide, with too much breadth at the points, hanging much on the sides: there is a looseness and laxity of the skin, with a coarseness in the hair of the coat; and they are often crooked in both the hind and fore legs. The sows of this breed are in high esteem for the purpose of breeding pigs of the roasting kind, for which they are well suited in consequence of their being more careful in the raising of their young than any of the smaller kinds of hogs, while at the same time they have a better size than some of them, with the particular advantage of being much more productive.

These hogs are not so well suited for stores as many others, as they have too much depth in the belly parts, with a hollowness and narrowness in the back, which unfit them for such use, and though they are large in such states of keep, by not having so much tendency to take on fat, they become expensive in the feeding, and do not ultimately increase to any very great weight. The breed might, however, be improved in many respects by being crossed by a suitable boar of a good kind. Their weight, at a year and a half old, is seldom much more than ten or eleven stone.

BLUE OR SANDY CHINESE BREED OR SORT.

In this kind of Chinese hog the colour is occasionally bluish, but more frequently of a sandy blue cast without any appearance of white in the mixture. The pigs are well, thickly, and compactly made, being very thick and full in the necks, large, and of good form in the bodies and hind parts; deep in the sides, with the bellies nearly approaching the ground, in consequence of the shortness of the legs, which are fine and well formed, the head, ears, and mouth rather short and small, but generally full, with the best shapes; the skin or rind very thin, with a great thinness and softness in the hair of the coat, and fineness in the grain and flavour of the flesh, and the disposition to fatten extremely great upon a small quantity of keep. They are, in fact, a very perfect sort of pig, rising to great weights at an early age, and affording bacon of a very good quality and large in quantity.

This sort of pig is only to be met with in some particular places in the midland and more northern districts of the kingdom; but where it can be had, it will be found a very excellent sort of hog.

NORFOLK BREED OR SORT.

The breed of hogs which abounds in the vicinity of Lynn, and generally on the Lincoln side of the county, is a rather large spotted sort of very good form and quality, which should be encouraged; but there is also another small, short, up-eared porking kind, various in colour, as white, bluish, striated, which being generally an inferior sort, it would be to the interest of that great corn county to improve; it is, however, thin-skinned and quick proving.

In the small Norfolk sort, the colour is for the most part white, the hair of the coat thin, and the bone in the different parts somewhat small. They possess a quickness in feeding without great consumption of food, but are deficient in size and weight, as they seldom rise in weight to more than from five or six to eight or ten stone.

SUFFOLK BREED OR SORT.

This is a delicate white sort, and rather small, which has for many years had a great reputation; and at this time there is not only a strong prejudice in their favour in their own county, but they have many advocates out of it. They are shorter and more pug-formed than the Norfolks, and by their dish-face and pendent belly, it may be supposed that the variety proceeded originally from the white

Chinese. Some of the Suffolks are very handsome and very regularly shaped; their defects are, that they are great consumers in proportion to their small bulk, and that they produce little flesh. It is supposed that the small Hampshire boar would be a profitable cross for sows of this breed. By crossing the Suffolk with the Western, Essex or Sussex kind, much improvement has been produced in both the breeds, and the sows bring better litters of pigs, and are more healthy.

These white pigs stand high on the legs, have a narrowness in the back part, and the fore part of the head rather broad, with a short hairy coat rather full of bristles. The weight in the full-grown state is commonly from fifteen to eighteen stone.

KENTISH BREED OR SORT.

This is a white coloured hog, which has much similarity to the above kind. They are somewhat long in the leg, with rather narrow backs, and with the ears of a medium length, but wide and thickly set with hair, which denotes a thickness in the rind or skin; the fore part of the head has also too much breadth for the size of such hogs. In the full grown and fat state they usually weigh from fifteen to eighteen stone.

ESSEX BREED OR SORT.

These hogs are up-eared, with long sharp heads; roach-backed; carcasses flat, long, and generally high upon the leg; bone not large; colour white, or black and white; bare of hair; quick feeders, but great consumers, and of an unquiet disposition. A mixture of the tonkey with this old breed produced an improved and shorter variety called the

ESSEX HALF BLACK BREED.

The best sorts of which are considered in that district to be equal to any in the kingdom. They feed remarkably quick, grow fast, are thin in the skin and light in the bone and offal, and they afford also an excellent quality of meat. The sows are good breeders. There are a great many pigs bred and fattened in this neighbourhood, and sent to market for jointing pork, weighing from six to eight or ten stone, which weight they come up to at five or six months old, without putting up: they usually have some beans given them as they run.

These are valuable sorts of hogs which ought to be more attended to than has hitherto been the case, as they are likely to benefit the district in a very considerable degree; whereas the old Essex breed has but little merit for any use whatever, being badly formed in most of their parts, and too expensive in the keep for the quantity of meat which they afford.

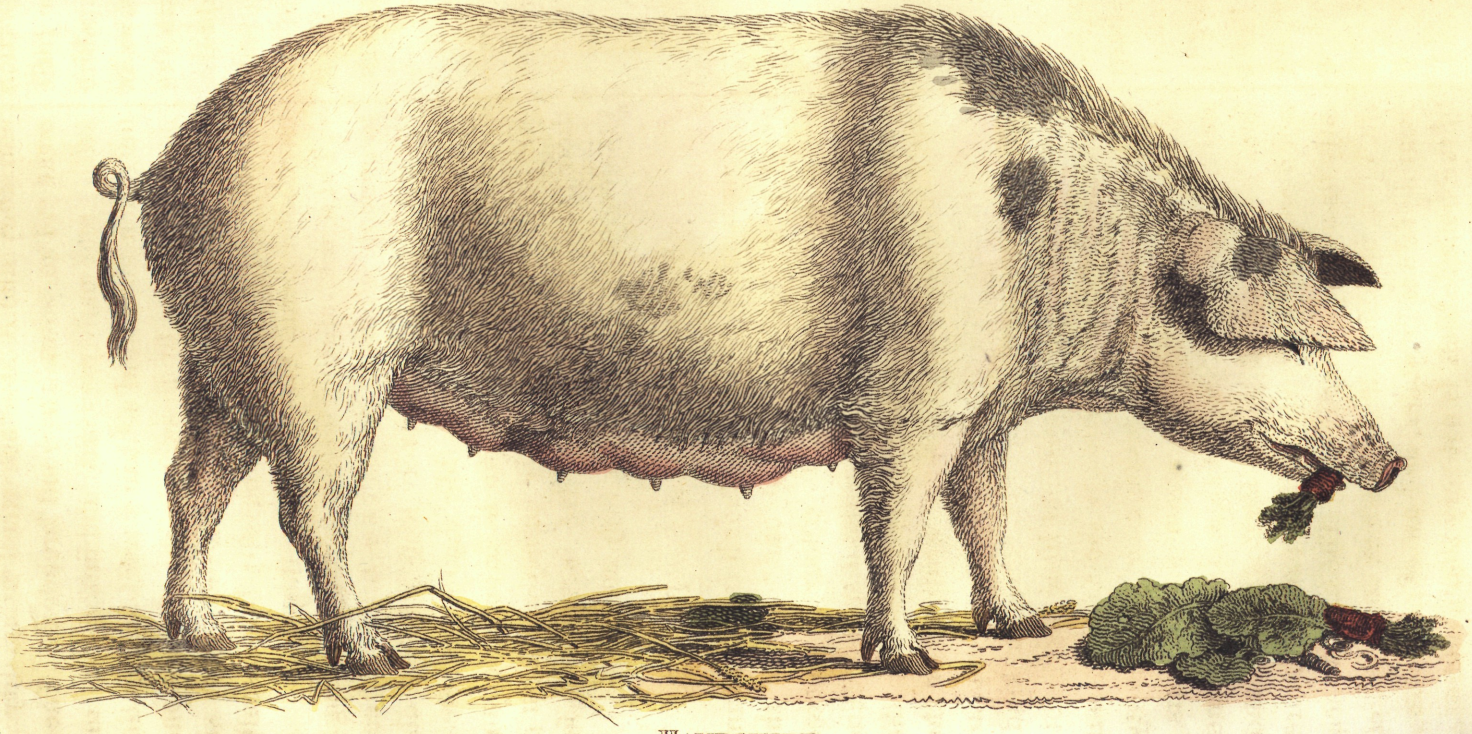
SUSSEX BREED OR SORT.

This is an excellent breed for its size, having great perfection in its make and many of the more important parts. Its colour is sheeted with black and white, but without spots. The head and tail parts have very commonly the different colours of black and white, or the contrary, which gives them a curious appearance that strongly marks the breed or kind. The hogs of this sort have but little size, notwithstanding the perfection in their make; but their skin or rind has a degree of superiority in thinness and fineness to many other sorts; and the hair of the coat is thin, but long and fine. They are rapid in their growth, and when properly fed come to their maturity more early than many other kinds. The ears, which are of a middling length, stand in a rather pointing forward manner, and are of good form. In the bone, which is not very small, there is a cleanness and goodness of form that is met with in but few breeds. The eye is perhaps

SMALL & LARGE BREEDS.



CHINESE.



HAMPSHIRE.

London, Published by Thos Kelly, *17, Paternoster Row, June 1, 1822.*

rather too quick and lively, and the snout parts of some of them are rather too long and thin, but the mouth in general is good. They are quick in feeding and not large consumers. The best sort of hogs of this kind in the country are probably at present raised at the residence of Charles Collis Western, Esquire, the member for the county of Essex, though the breed seems to have come from Sussex from the name which it bears.

DEVONSHIRE BREED OR SORT.

It is said in the Agricultural Report of that district, that several improvements have been made by a cross with the Leicester boar, which has much spread and given a roundness to its frame with a proportionable depth of body; its legs have also been shortened; a finer bone produced, with a disposition to look much better when growing as a store, and to feed quicker and more kindly in the sty. By a further cross with the Chinese breed, its size has been considerably reduced; but the advantages accruing therefrom are the constitution and habits of a profitable animal, weighing, when eighteen months old and fattened to its frame, from sixteen to twenty score.

This sort of hog, from the improvements which it has thus undergone, may have become a tolerably useful and good pig for many uses, though the size has suffered a considerable reduction, which is unfavourable to it. The old pig of this district was an ill-formed very indifferent animal for any purpose of the farmer or the butcher.

SMALL WHITE ENGLISH BREED OR SORT.

This is another small kind of hog that is met with in many districts. It is of a white colour; thick, compact, and well made in the body; short in the leg; the head and neck well formed; and the ears slouching a little downwards. It is well disposed to fatten, and is perfectly hardy. It prevails much in the northern districts in Sussex.

It is a very good and hardy sort for the purposes of cutting for roasting pork, as well as salting, being readily in a proper state of growth and fit for such uses without taking so much food as many other sorts. It stands cold better than most breeds where properly attended to, and under good care.

SWING-TAILED BREED OR SORT.

It is an useful sort of the smaller kind of hogs, that is hardy in its nature and of considerable weight in proportion to its size.

From its hardy nature, and being so weighty in a small compass, it may be found useful on many occasions where the smaller sort of hardy hogs are wanted, and where there is no great plenty of food for the raising or fattening of them. It is most suitable for cutting in joints and pickling as pork, and for small hams.

SCOTCH BREED OR SORT.

There is a particular breed of hogs in the northern parts of Scotland, whose appearance, being very different from that of any other sort in the island, denotes them to have been the original breed of the country. They are small, ill formed, bristly, wild-looking animals, and are very probably the remains of that breed which we may suppose to have ranged through the forests and woody parts of the kingdom for ages in a state of nature.

LARGE KINDS.

These large sorts have differences too in their forms, properties, habits, and dispositions, that fit them for different uses and purposes with much advantage and utility in various cases and circumstances.

BERKSHIRE BREED OR SORT.

This county has been long famous for its breed of swine, which is distinguished by being in general of a tawny, white, or reddish colour, spotted with black; large ears hanging over the eyes; thick, close, and well made in the body; legs short; small in the bone; having a disposition to fatten quickly; and when well fed, the flesh is fine. It is probable that the old breed is now so totally blended with others, that for a length of time past no possibility has existed of obtaining a perfect living model of such hogs. It has been described as long and rather crooked snouted, large heavy ears, body long and thick, but not very deep; legs short, with much bone. They formerly made great weights. The new or present breed, however, is lighter in the head and ear, shorter in the carcass, with somewhat less bone, and higher in the leg; in colour generally dark spotted, and it is generally supposed that the Berkshire breeders have made a very judicious use of the pug cross, by not repeating it to the degree of taking away all shape and power of growing flesh in their stock; and if they discontinue any further mixture, much advantage may be gained. The breed, as it now stands, is about in the third class, in point of size, excellent in all respects, but particularly as a cross for heavy slow-feeding sorts. The small porking variety of Berkshire hogs, and those of Oxfordshire, with round carcasses, short and handsome heads, appear to have descended from the Oxford breed of hogs.

The Berkshire is undoubtedly an useful breed that has extended itself from the district from which it takes its name over most parts of the island. It is the sort mostly fattened at the distilleries; it feeds to a great weight, and is good for either pork or bacon. This sort is considered as the most hardy, both in respect to their nature and the food on which they are fed; they require, however, constant good keep, declining fast under other circumstances.

Hogs of this kind are constantly either wholly spotted over their bodies with black, or of a perfectly sandy cast in every part; have rather long hairy coats, which are thinly set with hair, but apparently very rough, and much in the curled state. There is a feathered sort of ear in some of the better kinds of the breed, with longish hair rising on the outer edges of it, which is disagreeable in the appearance, but not in the least disadvantageous or hurtful to the hogs. From the coarse curly nature of their coats, they would seem to be thick and hard in the skin, but the contrary is the case, being in the largest, and finest kinds, particularly thin in the skin or rind, with an equality of fineness in the flesh or meat. They are probably better known by the state of their hairy coats than in any other way, having, in many cases, little or nothing of the bristly kind about them, which is a very beneficial quality in regard to their feeding and keep.

They are a sort which have the property, in general, of growing rapidly under good keep, so as to increase to a large size in a short time, for instance, from thirty to forty stone or more in the course of a year's full keep. They are an extremely valuable breed for most of the purposes for which the large kinds of hogs are required. The bacon which they afford, when well cured, is of the best quality, as has been fairly proved in many cases, being much preferred to that from the large fine Chinese sorts of hogs. There are, however, considerable differences in these kinds of hogs, but the rough curly-coated kinds are in general the best in form, as well as in the quality of their flesh, being superior to many other good sorts of other breeds.

Whether this kind of hog be proper for and capable of supporting the practice of the distillery, is a question not thoroughly decided; but there can hardly be a doubt, from their nature and quality, that they would stand the treatment in such cases without much difficulty.

HAMPSHIRE BREED OR SORT.

The hogs of this large breed are longer in the body and neck, but not of so compact a form as the Berkshire. They are mostly of a white colour or spotted, and are well disposed to fatten, coming up to a great weight when properly managed in respect to keep. They are generally dark spotted, some black, of a longer and flatter make than those of Berkshire, ears more pointed, with the head long and sharp, resembling the Essex. It is in this state that they are generally found in the range of Basingstoke and Andover. They are commonly bought up with the Berkshire stock, the dealers themselves being inattentive to any distinction between the two varieties. The goodness of the Hampshire hog is proverbial, and there is seldom or ever observed greater or quicker proof in any breed.

It has been remarked, that the Berkshire and Hampshire hogs are the largest to be found in the country; and that it is most probably from the former sort of stock that the greatest number of varieties have sprung. The Berkshire and Hampshire swine are of a very large size, the fore quarters frequently weighing, when fat, not less than from six hundred to eight hundred weight: the medium weight of the hogs fattened for hams and bacon do not, however, exceed from three hundred to four hundred weight. But there is another breed, which is considered to be the largest in the island.

The Hampshire breed of hogs, from the largeness of size, and the many excellent qualities which it possesses, is superior to some other large breeds, especially where bacon is the main object of the breeder and rearer. From the sides being, in some measure, inclined to be flattish, there is every reason to suppose they will stand the system of the distillery, particularly as, on account of its large size, it requires good and full keep to bring it to its full growth and weight.

SHROPSHIRE BREED OR SORT.

This is a breed of the largest size, flat bone, deep and flat sided, harsh or rather wiry haired; the ear large; the head long, sharp, and coarse; leg too long; loin, although very substantial, yet not sufficiently wide, considering the great extent of the whole frame. This breed, though not so well formed as those of the Berkshire kind, are equal to them in their disposition to fatten on cheap food, and are found valuable where the keep is in sufficient abundance for their support. With all their defects, they have always been considered excellent stock, and have been improved within the last fifteen or thirty years, by the Berkshire cross, which has reduced the length both of their legs and carcass, and rendered their heads lighter. This new variety, showing the Berkshire spots and form, feeds quicker than the old breed.

It has been noticed, that the standard colour is white or brinded, and that, anterior to the late improvement, they might be looked upon, as nearly as possible, the original large breed of this country.

Shropshire farmers have long been employed in breeding stores for the supply of the London feeders, and of the Essex farmers, who thus turn their clovers to the most profitable account.

They are a large, inactive, heavy kind of

hogs, having large bones, with much bristly hair about them. They have, in their colour, sometimes a great deal of white, spotted with black, or in a patchy state, but occasionally inclined to a sandy cast. They only suit the farmer in particular situations and circumstances of full good keep, but with the distillers they are favourites, as going on well with their high keep of wash and grains, with pea and barley meals to complete them; as a heavy coarse hog of this kind is found very suitable in this way of fattening, length of time and good keep being objects of but little consequence when repaid by weight of carcass.

GLOUCESTERSHIRE BREED OR SORT.

This is likewise a large breed, but inferior to either the Hampshire or Shropshire, being tall and long in shape, and by no means so well formed. The colour is in general white. It has two wattles hanging from the throat. This is supposed, by Mr. Marshall, to have been the prevailing breed of Ireland; though the Shropshire, as before suggested, is considered to have been the original breed. The Gloucestershire are thinner in the skin than the Berkshire breed, and require better sorts of food. This breed is considered to be a size under the Hereford sort, and a shorter and more trussed pig; and is distinguished by a handsome roundness of the bone and frame. Formerly many sandy pigs were seen among them, and some with very heavy and thick ears. They are not now so heavy eared, and they are considered as good stock for any purpose whatever.

This is probably, however, a less valuable sort of hog than those that have been just noticed, but as having so great a weight and being of rather quick growth, it probably may be found to be suitable for large dairy districts, both as pork and bacon.

HEREFORDSHIRE BREED OR SORT.

This is also a large useful breed, but, in all probability, possessing no advantages over those already described. It is considered, by some, to be a variety of the Shropshire, or an intermixture which cannot now be traced; but the animals are shorter, have less bone, and lighter heads; the ears smaller, thinner, and more pointed; coats somewhat less harsh than those of the Shropshire kind, and are quick feeders; colour originally of a light cast. There may be found, in this breed, many individuals of the truest form: they are generally good sound stock, full of growth, and assuredly among the most profitable bacon-hogs that are found in the country. Of late, the Herefordshires have been crossed with the Berkshire boars, of which cross the best of them, it is thought, did not stand in any great need.

This breed, where it can be readily had, and where there is plenty of suitable keep, makes excellent hogs for the purpose of bacon.

WILTSHIRE BREED OR SORT.

This is a long-bodied, low hog, hollow about the shoulder, and high on the rump, middling-sized, pointed ears, round bone, and light in colour. It has been stated, that of late years this breed has been crossed with the pug, and with the Berkshire sorts; and that the new variety appeared to be smaller than the old breed, and darker in colour, spotted, with round carcass, handsome pug face, and some with prick ears. This cross is by no means a new variety. The boars originally made use of were of the wild breed, from Barbadoes, in colour red, or red spotted with black, which were sent from that island, more than fifty years since, to a farmer at Axford, near Marlborough, and thence the variety produced were called the Axford breed. The Axford smaller variety

and part of the new Berkshire, no doubt originated in the same source.

This, like the Gloucester, is a sort which is useful in dairy districts, giving a large quantity of pork and bacon, when well fed, with such intentions. There are, however, many better and more profitable breeds for such purposes.

NORTHAMPTONSHIRE BREED OR SORT.

This was formerly a handsome, light-eared, white, deep-sided pig, with middling bone and quick of proof; but the breeders tried the new Leicesters, without success. They have again, it seems, returned to their old breed, adopted some improving cross, and, at present, breed middle-sized, well-shaped, pigs, both for their own and the Buckinghamshire dairy farmers.

This is a smaller sort of hog, of the dairy kind, that is found to answer well in the dairy keep of some places, giving much good pork for cutting and pickling uses.

LEICESTERSHIRE BREED OR SORT.

This breed was originally large, deep, and flat-sided; light spotted, with rather a handsome head and ear. It is a breed in which the pigs are not only remarkably quick feeders, but very broad over the backs and on the shoulders, round in the ribs, and extremely full in the hams, being capable of fattening with much less food than most of the old breeds. It is perhaps not yet ascertained, whether the Bakewell variety has much merit in its own county; but it can hardly be doubted that it is a valuable kind of hog in its improved state, and is a good, quick-feeding, and growing kind, that answers well for pork and small hams.

LINCOLNSHIRE BREED OR SORT.

This breed was formerly light coloured and white, like the Northamptonshire breed, having curled and woolly coats. They are middle-sized, quick-proving pigs.

These hogs have a superiority in their shapes to most others, but not equal to the best Berkshire breed; the ears are of the medium length, but rather close in their standing on the head, and project in a forward manner, sharp in the points, flat, and turning up in a slight degree at the end. The form of the head is good with a moderate length of the face part; the hair of the coat rather long and thinly set upon the skin, with but few bristles; thin in the rind, with a straightness and due breadth of the back in the whole length of the hog; deep-sided, but rather too much rounded; the length greater than in many other breeds; the size good; weight usually from eighteen to twenty-five stone, when well fed, at the age of a year and a half. They are a compact and handsome sort of pigs, that are scarcely equalled by any others, except some of the best sort of the Berkshire kind. They display, however, a want of hardiness. They are a heavily-fleshed kind of hogs, having a good mixture of lean and fat in their meat; they fatten with a degree of expedition, but are not so quick in their growth as some breeds of less size. They are a very valuable sort of hog for many purposes.

YORKSHIRE BREED OR SORT.

The old Yorkshire breed is supposed to have been the worst of the large sort, being extremely long-legged and weak loined, with a constitution not of the soundest kind, and are bad sty-pigs in the winter season; notwithstanding which they are quicker feeders than some of the superior breeds. They have been improving some years from the Berkshire cross; but the new breed is still inferior to the north-western stock, bringing a less price at market. It is suggested that the short-legged Gloucestershire boars might probably succeed with

this breed, or that the entire adoption of Hereford stock might be attended with still more profit.

This tall, thin, white, narrow-backed, flat-sided breed of hogs has latterly been very greatly improved, not only by the spotted Berkshire slouch-eared sort, but by crossing it with the improved Leicester kind, which have most of the requisite good properties, together with a great aptitude to fatten in a ready manner.

The hogs of this kind are of the same colour as some of the Berkshire kinds, being of a whitish sandy cast with spots of black; ears rather long, and not coming forward; hair hard and short, with a great many bristles in different parts; large in the bone; flat in the side; long in the legs, having, in the full-grown state, the weight of from twenty to near thirty stone. They are found useful in the distilleries, as standing that system of keeping in an excellent manner. They are, however, somewhat slow in feeding, and do not always give the necessary profit to the keeper.

WARWICKSHIRE BREED OR SORT.

This breed is large, long, and spotted, with heavy ears, but in general may be described as a rather good sort of large hogs, which making a great produce of pork and bacon, keeping and feeding well without much consumption of food, considering their great size. Some of them are a little flat in the side, which is probably no fault when it does not render them narrow in the back, and thin in the body part. In other points they are mostly of good shapes, but the ears are too heavy and slouching, with the hair of the coat stiff and bristly on some parts, but the skin not thick for such large sized pigs.

WORCESTERSHIRE BREED OR SORT.

This is apparently a variety between the Hereford and Warwick; the hogs are of great size, and where they can be procured of the best kind are very valuable, and, when well fed, are fit for all purposes of the bacon and pork description. They consume much in the same proportion as the Warwick breed of hogs, though they are somewhat larger and more full bodied.

OXFORDSHIRE BREED OR SORT.

This is most probably a variety of the Warwick, but mixed with the small porking breed of the Berkshire kind.

This mixed breed is of less size than that just mentioned, but a good thriving sort both in the store and feeding states, giving pork of the salting and roasting kinds in a rather full quantity for such kind of hogs. They have the property of eating many kinds of vegetable roots and plants better than some other breeds, and of thriving and increasing fast in their store growth upon them, especially on the Swedish turnip, by which they become fat at an early period of their age.

CHESHIRE BREED OR SORT.

These are hogs of an extremely large size, their colour mostly of the black and white, but sometimes of the bluish and white casts, in extensive patches, without any small spots, and occasionally they are quite white. They are large in the head part, with a considerable length of ear, hanging much down over the sides of the head; the length from the different extreme parts of the animal is very great, and the tail is also very long. They have much narrowness in proportion to their height, and in many cases an arched state of the spine or back-bone, with much depth and flatness of the sides; large in the bone, long in the leg, with much wrinkling and laxity in the skin, which are imperfections of form that

greatly require amendment; but from their great size, with good full keep, they often afford more profit than better formed breeds. They are not a profitable breed in their present form and make, as they require too much food and too high keep for the production of bacon; but they suit in the large dairy systems in the district to which they belong. They are less thriving in their store growth and in fattening than some other large sorts; but this quality, as well as some others, might probably be improved in a most beneficial manner by crossing them with boars of the most perfect Berkshire kind, as they seem well suited to each other for such a purpose, and such a mixture would be the means of raising them to a high degree of perfection as large hogs of the bacon kind.

They can, however, be only a convenient, suitable, and profitable, sort of stock in particular cases and circumstances, as where the meat of them is to be used for the purpose of curing for bacon, as it becomes more juicy, better tasted, and more perfect in its nature and means of keeping, than the smaller sorts, where the grain of the flesh is finer.

The large breed of the county has been crossed with the tonkey, and their stock fattened for Birmingham and other large markets. Derbyshire formerly bred the largest pigs in the island, but they were a heavy slow-proving breed, with immense bone and thick large ears. At present, the above county does not breed much of this sort of stock.

RUDGWICK BREED OR STOCK.

This is a large kind of swine, which has been considered the largest in the island, and is met with in the village of that name, on the borders of Sussex and Surrey. They feed to an extraordinary size, and weigh, at two years old, nearly double or triple the usual weight of most other sorts of hogs at that age.

This breed of hogs is a good kind of the large sort; it requires much good keep, which raises it to an unusual weight, and gives a large quantity of very excellent meat; but as it is a length of time before it gets into the proper fat state, the consumption of food is very great, though the quantity of meat that is ultimately produced returns an ample profit. The breed, however, is not much known, nor the cultivation or improvement of it much attended to in the situation, where it had its origin and name.

LARGE SPOTTED WOBURN BREED OR SORT.

This breed was introduced by Francis, the late Duke of Bedford; it is large in size, and of various colours. It is a hard, well-formed, prolific sort, rising quickly to a large weight.

As large breeds pay the farmer best in many respects, such a breed deserves to be attended to in the system of hog management.

Such hogs, by proper attention and improvement, would become of great use both for pork in the pickled state, and that of cutting for roasting, as they gain their full growth at an early period, and are quick in being fed, without any large consumption of food, as they are close and well made in most of their parts. These hogs are consequently well fitted for many situations and circumstances of the farmer, and yet their utility and advantages are but little known.

IRISH BREEDS OR SORTS.

The swine of Ireland are, in general, large and middle sized; but, as no great attention is paid to their management, the pork is far from being good or delicate. The hogs are suffered to feed upon any filth or rubbish they meet with; and, till about fifty years ago, they were suffered to prowl about the public streets

of Dublin, but the Irish parliament very properly put a termination to this annoyance. A great quantity of Irish pork is, however, salted for exportation, which shews that they have many swine, and the breeds have lately been much improved.

The hogs of this country are, for the most part, badly formed, thin in the bodies, with bristly staring coats from the head to the tail, having but little disposition to thrive in any tolerable manner, so that they are long in fattening. They are, however, very large in size, with much bone. The true hogs of this kind have commonly large slouching ears that cover much of the sides of their foreheads, and snouts which nearly reach the ground when they are feeding. The colour of them is in general white or spotted black and white, and they are very similar in the mould and form. The qualities of the hogs of this country are now daily growing better in consequence of the attention, that has for some time been paid to them by many distinguished and spirited breeders, a circumstance which must be productive of vast advantage to Ireland, from the great quantities of pork and bacon which are continually prepared and sent from that part of the kingdom.

MIXED BREEDS.

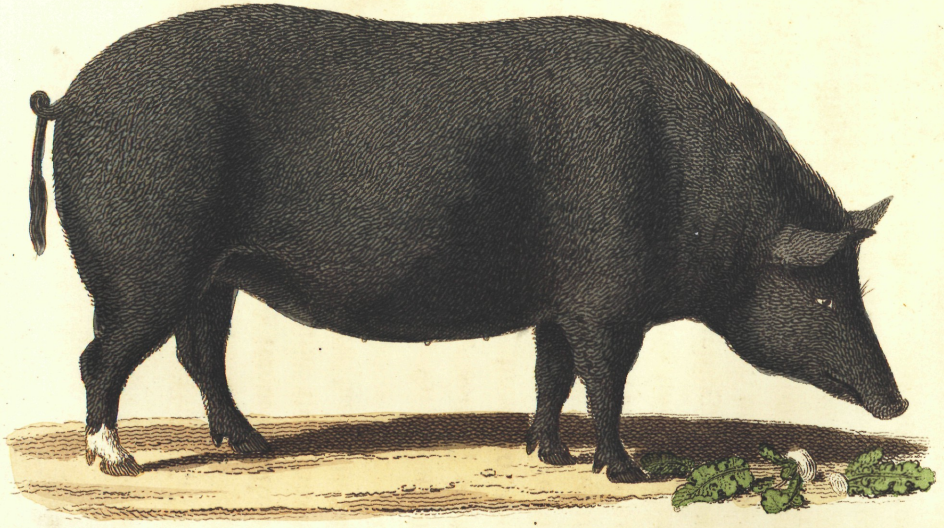
Some farmers prefer mixed breeds, supposing them more beneficial than either the large or small perfect breeds. In this case the Berkshire with a cross of the Chinese will be found a very profitable sort, as being capable of feeding to a considerable weight, with a moderate proportion of food, and in a short time. Staffordshire and other places have mixed breeds. Hertfordshire and Cambridgeshire have a lop-eared variety, resembling the lighter breeds of the midland districts.

SECTION IV.—*Points and Circumstances to be regarded in breeding Hogs.*

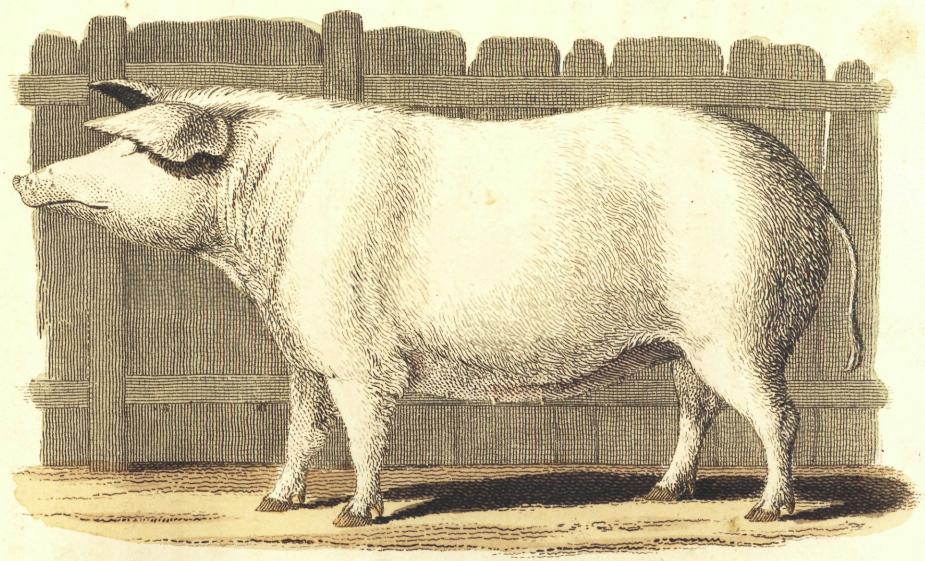
THE breeding of hogs is a business of much utility and profit in many situations and circumstances of farmers and others, who have proper and sufficient means of keep for raising them in a suitable manner.

The number of regular breeding districts or counties of this kind of live stock is very considerable, and the peculiar characteristics of form in each sort or variety is as distinctly marked as in any other class of animals. There are such numbers of intermixtures that radical changes are introduced in the course of time, even in those districts most prejudiced in favour of their own peculiar sorts or varieties; and in many counties, where a few only are bred for home use, they have no settled breed, which is a common case with every other kind of cattle stock. There can be no doubt but that the difference of breed in this sort of live stock is as obvious and necessary as in that of most other kinds; and that in order to have good hogs or pigs, it is as necessary to be attentive to the breeds as it is in the other sorts of domestic animals. Therefore, in the breeding the different sorts in the view of improvement, whether by crossing or otherwise, much care is required in adapting them as perfectly as possible to the nature of the objects aimed at, as much injury, instead of benefit, must necessarily arise from the union of dissimilar breeds, as has been proved in various works which have been published. Whatever the breed or sort of swine may be that is employed in the raising of the stock, the best formed male and female animals of the same or other proper kind should be selected for the purpose; and in providing hogs for the purpose of breeding they should be constantly well fed; for, if stinted in food, their growth and condition will

DIFFERENT VALUABLE BREEDS.



SUSSEX.



ENGLISH.



BERKSHIRE.

London, Published by Thos Kelly, 17, *Paternoster Row, June 1, 1822.*

be considerably affected and injured by such neglect.

It is evident that where there is a certain and ready vent for the stock produced, the breeder will always be well repaid for growing and purchasing food in this intention; and that breeding, in proportion to the greater trouble and risk, is more profitable than purchasing the stores. Further, that if it be intended to breed for sale in a store state, it is of greater consequence to procure a regular and well-shaped breed, as such will always meet a preference in the fair or market, especially if they are to be driven to the southern districts. The nature and size of the breed should depend upon the abundance or scarcity of the food or keep, and upon the kind of management which is employed in keeping them. In the former case, the large breeds are the most profitable, from the circumstance of the difference in the proportions between the living and the dead profitable weights being the least in the largest kinds.

In cases where swine are made an object to the breeder and farmer, great care should be taken to have a good boar constantly along with the sows, in order that a proper succession of young hogs or pigs may be produced; as by this means the sows are made to take the boar more expeditiously. No sows should be kept open for breeding unless they have large capacious bellies, and are properly formed for the purpose.

In the breeding of hogs, therefore, the utmost care should constantly be taken to have them of the most suitable and proper forms and shapes in all their different parts, for the intentions for which they are designed; and with all such good properties and qualities as are the most beneficial and useful with a view to profit and convenience in the circumstances of their keep.

The forms of the whole and of the several different parts should be as nearly as possible as described below.

HEAD.

This should be full, well fleshed, and with a smallness in the mouth part; rather fine in the snout or nose end part, not too long, thin and straight in the fore part of the face from the upper portion of the head to the end of the snout; as by this form of these parts, there will not only be less food consumed in feeding the hog, but that which is used will be better prepared for digestion by the stomach of the animal.

EYE.

This should be small without too great a degree of liveliness or shining about it, such a look indicating the greatest certainty of a ready disposition to fatten; while too lively an appearance often denotes a sort of wildness which prevents the hogs from thriving and taking on flesh and fat in a proper manner.

SNOUT.

A degree of fineness in the snout is almost a certain indication that the shape in the other parts will be good and correct, especially where the upper part of the head has at the same time a contraction and narrowness about it.

EARS.

These should not be too long, but should have a thinness and sharpness at the points, turning somewhat upwards and standing not too far apart, but coming in a forward direction, so as nearly to approach each other at the points. These, where the fore part of the head has a narrowness, and the cheek parts are full and distended with flesh, the hair without many bristles, thinnish and of good length, are almost always certain signs of the best properties in the several kinds of hogs, and especially of

their being easily kept in feeding or rearing; while such hogs as are heavy in the ear, and closely and thickly set in the hair of their coats, are generally thick and coarse in the skin, which is often loose, of the worst kind, and full of wrinkles. Large heavy long ears that hang down much on the sides generally also denote a bad disposition for thriving in the hogs, which will cause a great consumption of food in fattening them.

NECK.

This is a very important point or part in the hog; the higher and side parts of which, in all cases, should be quite full and enlarged, being in the fattened state pretty much the same breadth in the upper part as that of the back and body parts; and which, being separated from them, should be of nearly the same dimensions in the whole of the round. It is very material that this part should be thick and full, as in that case there will always be reason to expect plenty of lean meat in the store state, and when in the fattening condition, there is almost always a certainty of its covering and extending thoroughly on the back portion as well as on the chine and sides, internally and externally. When killed as porkers, hogs of this description give heavy cuttings of these prime parts, a circumstance very advantageous to the breeder and consumer; and when they are continued as bacon hogs, such meaty substance extending in most directions, affords in the flitches that mixed layery state, which is the most desirable, and the fat of which is the most firm and solid with the least degree of slabbiness. On the other hand, hogs that are not so formed have constantly too much fat for any use, and the taste of the meat is more insipid.

SHOULDER.

There should be much breadth on the top part of the shoulder, which should extend straight and even quite to the tail, which should be set on low and be hardly seen when in the fattened state. These parts should be considerably extended on each side, so as to give a full depth; but they should not be too round, with good sides from the setting on of the head to that of the tail, which should be rather small and of proportionate length, and thinly set with hair.

BODY OR BARREL.

This part of the hog should be rather full and deep, but not too much rounded in the rib, so as to render it necessary for the animal to lie too much on the belly part in the store keeping or fattening states. Each extremity of such body part should, in all cases, be well filled up so as to give the hog the greatest possible weight, and form the most perfect flitches of the bacon kind, or give the best cuttings as meat for roasting and pickling. The belly in well formed hogs should come nearly to the ground from one end to the other, and extend well towards the chop parts of them.

TWIST.

This should be well cloven all the way down from the setting on of the tail part, betwixt the thighs to the hough, so as to give a fulness to the ham parts, which is very material.

THIGHS.

These should be of a good thickness both on the inside and the out, swelling properly in a gradual manner upwards to the top of the cleft of the twist, which is the best and most useful form of these very important parts of the hog.

LEGS.

These should not have too much length, but be proportioned to the other parts, being rather short from the hough to the ground; the bone thin, and somewhat light and small in proportion to the size of the hog.

HOOFS.

The best form of the hoofs is a short and somewhat round shape, such as renders the tread of the hog even on the different legs, and enables it to stand firmly, without any sort of shrinking or lameness, as the hog thereby feeds and becomes in the fat state in a better manner than in other cases.

COAT.

The hair should not be too bristly, but the more soft and woolly the better, of a good length, fine, and rather thinly set, but not so much so as to cause the animal to suffer from the effects of cold in too great a degree, as it would be thereby much injured in its thriving properties, and be less ready in reaching the point of maturity.

SKIN, RIND OR HIDE.

The hide is the best when it has a thinness in proportion to the largeness of the hog, without any sort of looseness, wrinkling, or over abundance of it in any part, as a thinness and delicacy of rind is a sign of the disposition to feed well without extravagant keep.

Such are the most proper and beneficial shapes of the several parts, and of the entire hog for the uses of breeding, affording the most profit, utility, and advantage, in most intentions to which they can be applied; although in some situations and modes of management particular sorts of hogs are required and found to answer best, as in the cases below.

DISTILLERIES.

As there is no litter used for the animals to rest upon in distilleries, it is only a particular sort that has any chance of returning the requisite profit and advantages. The hogs most suitable for this purpose are those which are long in the ear, and have a flatness in the side parts, which enables them to rest better on the wooden or stone floors without any sort of litter. In consequence of these circumstances, the distillers near the metropolis have found the above sort of hogs with thick hairy coats to be preferable to those kinds which have a rounder form of the body parts, and which by resting more upon their bellies with their legs underneath them, become much cramped, and often extremely lame, being incapable of standing on such hot and hard floors, particularly in hot seasons. Such hogs, however, take a much larger quantity of food to render them fat, though the great length and coarseness of their coats, with the great thickness of their hides, enable them to rest on their sides on such hard floors, and in some degree protect them from getting lame and crippled before they have become ready for the purposes of bacon. But no sort of hogs can support the keep of the distilleries until they have fully attained one year's growth, and then they generally require another in the sties of the distillery to perfect them for their intended use. It is therefore always necessary to regard the uses for which hogs are designed, as no sort, however good in their forms or properties, are suitable for all intentions stated under the several heads.

MEANS OF GAINING SUCH FORMS AND PROPERTIES IN THIS SORT OF ANIMAL.

According to the principles that have been laid down in the former part of this work, these objects are to be attained by carefully providing such kinds, in the first instance, as approach nearest to the proper shape of the whole animal, and are most perfect in the several more important parts; and afterwards by a correct selection in the progeny, to unite and breed from the families and kinds which are the best and most perfectly made, in every respect, and which have the greatest superiority in their

different useful and valuable properties and qualities of every sort; but more particularly those which are most necessary in forwarding the actual intention of the breeder or raiser of such stock. This practice should be continued as long as any improvement in the breeds or kinds appears to be going on; but the moment there is any apparent decline, to have recourse to crossing with such individuals of the same family, or other sorts which are the most appropriate, and have the most fitness for restoring the breed. By this method, the greatest perfection in the breeding of this, as well as other sorts of farm live-stock, may be arrived at; but hitherto very little has ever been attempted, with respect to hog or pig-stock, on any consistent and solid principles of bettering the practices of breeding.

Section V.—*Boar, or Male Hog.*

It is the character of a good boar, that he should be firm, and well made in his quarters, and be thick and well-grown about the neck and cheeks. He should not be too long, but full in the head and fine in the bone; thick, full, and compact in the carcass; full in the quarters; fine and thin in the hide, and of a full size, according to whatever sort it may be, with a disposition to fatten expeditiously at an early age. Some of the ancients, as Varro and Columella, have, however, described what were considered in their time the signs or marks of a good boar hog, which were, a small head, short legs, long bodies, large thighs and necks, and the bristles, particularly on the neck, thick set, erect, and strong in their nature. And it has been considered, that depth of carcass, lateral expansion, breadth of the loin and breast, proportional length, moderate shortness of the legs, and substance of the gammons and fore-arms, are great and essential points in the make of the boar-hog. These are qualities to produce a favourable balance in the account of keep; and a mass of weight which will pull the scales well down. In proportion, too, as the animal is capacious in the loin and breast, will generally be the vigour of his constitution; the legs will be thence properly extended, and will have a bold and firm footing on the ground, to which, however, it is farther necessary that the claws be upright, even, and sound in their different respects. A good hog may sometimes have a coarse, long, ugly head and ear, which may be properly classed among the less proper and essential parts; yet a short, handsome, sprightly head, with light, pointed, pendulous ears, of moderate size, are pleasing to the view, and will have a favourable effect in the market. For head and ears, the Oxford, or rather smaller Berkshire hogs, are good models, and for true shape, the improved Shropshire, Herefordshire, and Gloucestershire sorts. Where colour deserves any consideration, the light and sandy, with yellow-spotted bodies, are perhaps to be preferred; at least, such skins or rinds appear by far the most delicate when the hogs are dead or dressed. The particular form of the ear in this sort of animals, and the quality of the hair, are, with many, leading marks of distinction. The pendulous, or lop-ear, and harsh hair, generally indicate large size, and the thickest skin. Erect or prick-eared hogs are generally of a smaller size, and quicker feeders. With respect to the skin of pork, some farmers give the preference to the thicker sort, but the thinner is generally considered the best; the best-bred pigs are often thick-skinned, but the skin is tender, glutinous, shining, easy to masticate, even in the shape of roasted crackling, and very nutritious and easy of digestion.

The best stock may, in most cases, be expected from the boar when at the full growth, and when not more than from three to five years old. The boar should always be a year old or more before he is put to the sow, as by this delay he attains more vigour, energy, and strength of constitution.

Such boars as are less fine in their several more useful parts, are found, from experience, to be sometimes better for getting good pig-stock than those which are more fine and perfect in their forms and shapes. Thus, for instance, when there is a shortness in the legs, the haunch parts much let down both behind and before, with a length of side, and a full breadth on the back, with much disposition to fatten, less finely and straightly made, with more bone, and tolerably well, but more coarsely, formed im most of their parts, the produce of such boars is generally more inclined to have a better growth, and more hardiness, attaining their full perfection in much less time, and affording much more profit and advantage in their after keep. This is considered, by some, as not only the case in pig-stock, but in that of most other kinds.

Section VI.—*Sow, or Female Hog.*

In these animals there are differences, as they may be of different kinds; but in all cases, when well fed from the teat, the sow will procreate at seven months; and if they be of the kind in which there is a strong tendency to fatten, it increases the risk of bringing forth; probably the suffering them to breed as early, and as quickly as possible, may contribute to amend the defect. And if a sow of this description would admit the boar the third, or a few days after pigging, the severe task of constant breeding and suckling, would no doubt keep her sufficiently lean and roomy for the production of a good litter of pigs. It is probable, however, that the quality and size of the pigs would be deteriorated, in some degree. It is better, however, to defer the sow's taking the boar till ten or twelve months old, as she then becomes more strong, and affords better litters of pigs.

In respect to the period of being with young, the sow is about four months; and the usual produce is from about eight to ten or twelve pigs, in the large, but more in the smaller, breeds, which, in general, bring the greatest number, and the most early.

It is usual for the sow to bring forth twice in the course of the year, affording generally the above number at each litter; she goes four months with young, bringing forth in the beginning of the fifth. It is necessary to prevent her from being disturbed at the time, as otherwise she may sometimes destroy the young pigs; and it is particularly requisite, that the male hog be kept away, as the whole litter is occasionally in danger of being killed by him.

The best sort of sows for the raising of pigs, are those which have the greatest dispositions for the taking care of their offspring while in the sucking state, having a gentleness and a sort of pleasure in suckling them, with a ready and full flow of milk, the teats being good and sufficient in number. With these properties, sows seldom fail of becoming good nurses in the bringing up of their progeny.

Farrowing, or bringing forth, and early suckling young pigs.

Particular care should be taken, that the sows, as they advance in their pregnancy, be lodged separately, lest their bellies be hurt by others treading or lying upon them; and it is of still more consequence, that no other swine be within reach of them at the time of bringing forth, since in that case the pigs would most

probably be devoured as they fall. The sows should also be carefully attended in pigging, in order to preserve the pigs; and sometimes this attention will be necessary during three or four days. Such sows as have the unnatural propensity of devouring their young should be well secured at the time, and be disposed of as soon as possible, as they will never answer the purpose of being kept as breeders.

During the time of parturition, dry, warm, and comfortable lodging is of almost as much importance as that of food; the sows and their young should not be turned abroad, by any means, in bad weather. The pigs may be weaned in about eight weeks, after which the sows may be shut up, feeding them rather well, and on the return of their milk they will generally express very plainly their desire of taking the boar. The sows require to be fed in an extraordinary manner while they are nursing, particularly if they have a number of pigs to support.

It has been directed that a sow of the above description should either be muzzled, or her snout fast strapped for several days, the trouble being taken to attend her meals, or the experiment be tried of anointing the pigs with a pomade of train oil and common aloes.

In the bringing forth of young pigs it seldom or ever happens that any thing is necessary in the way of assisting the sows, as in all animals where the young are numerous they are mostly small, and readily brought forth by the efforts of nature without the assistance of art. In the farrowing state, the sows are best put up into proper sties which have been well littered down with clean good straw, a few days before the business is supposed to take place, in order that they may prepare themselves in their proper situations for the purpose. They may have at the same time opening wash with pollard or other such substances given them in rather a sparing manner, so as to render the state of their bowels somewhat loose, as being favourable to the process of farrowing, by taking away any over-fulness that there may be. In the time of the farrowing, attention should be paid to have the sows kept quite quiet, and free from any kind of noise or disturbance, the young pigs being at first well regarded as to their situations, being taken away, when necessary, for a time, and kept warmly covered, except their heads, by the fire, having a few spoonfuls of good milk given to each of them when required by their weakness or want of support. They should then, as soon as the sows have completed the farrowing, be put to them again, and suffered to suck in a careful manner until they are perfectly satisfied, when they may be either left wholly with the sows, or be again removed and brought back as before, till they have become of proper strength to be trusted to the sow's own care in the second or third day. By this means most of the pigs that are brought forth in the living state will be saved and raised without much difficulty. After the pigs get sufficiently strong to be able to go with the sows, they should be put, if convenient, in fine days, into some grass paddock near the sties with the sows with them, and let them remain for half of the day; by which means they increase rapidly in strength: but the sows, at the same time, should be well fed with good food of the grain kind, which the young pigs should be learned to eat as soon as possible. Where the breeding of this sort of stock is extensive, it is also a good practice to have a separate small portion of ground near at hand for the pigs to be turned into, and well fed with good oats in an unreduced state, until the time of weaning, which food increases their growth very much,

and renders them far better pigs afterwards. Each young pig will consume in this manner from a pint and a-half to two pints in the day, the benefit of which is hardly to be conceived by those who have not tried it. They may then be fed in the winter and summer in the store manner, as stated below, with the best effect that such young stock is capable of receiving.

SEASONS MOST PROPER FOR FARROWING.

The best time of farrowing is early in the spring months, as the sows have then the warmth of the fine summer season coming on before them, and get on in the most rapid manner, and with the fewest checks and impediments to their growth; whereas those litters which are farrowed on the approach of the winter months never have the same quick growth and increase, however well fed or taken care of, as the others,—nor are they capable of being made so fine or good pig stock.

A late writer has observed that, as there is great difficulty and expense attending the rearing of young pigs in cold seasons, the farmer should contrive, as much as possible, to have his litters early, both in the spring and autumn seasons, as about the end of March or beginning of April, and the latter end of July, August, or beginning of the following month; as at those periods much less loss will be sustained by the deaths of the pigs, and less expense will be incurred in feeding them. The litters which are pigged in June or the early part of the following month, should always be reared, as being highly profitable and advantageous; but it is seldom advisable to keep the late autumn litters, as the cold in winter is almost sure to destroy many of them. Sometimes, however, it may be beneficial to suffer a late litter to suckle and feed with the sow, the keep being of the most forcing kind, during three or four months, from which management the most delicate pork may be provided at a scarce season.

The most effectual manner of getting these pigs forward is the keeping them well fed with some sort of unbroken grain in their early state, which should be given them in warm, dry, well-littered yards and sties, where they are sufficiently protected from the north and east winds, and from all kinds of wetness. In cases, too, where the dairy systems are practised, they may be well kept and raised by the flet milk in the winter season, and that of the whey in the summer, with the grain as directed in the above cases, or the stubbles when they can be used.

Young pigs, while in the suckling state, should constantly be kept as fully as possible; and the sows should have plenty of such food and keep as is the best calculated for the forcing of milk, such as those of the richest and most juicy vegetable kinds, lettuces for instance, with sufficient wash of the slightly-broken pea and bean kinds, and a proper quantity of some dry suitable keep of the meal kinds. By such keep the pigs are sure to get on well, and form good hogs, which is never the case where the food is scanty or sparing.

The sties should be kept constantly fresh littered, and quite sweet, dry, and clean, by being frequently swept out. The troughs, and every thing out of which they eat, should be frequently washed, and made perfectly clean and sweet, by which means the sows and the pigs go on in the best possible manner.

CASTRATING AND SPAYING.

The operations of gelding male pigs and of spaying sows are very conducive to their fattening. In all cases, it is best to have pigs

castrated at about three weeks old, and the female ones to be cut or spayed when a month old; though, in the latter case, the operation is frequently performed at a much later period. Sows, when not wanted for the purpose of breeding, should be spayed; a business mostly done by a person who is in the constant practice of it, as it requires experience and care. It is performed by cutting them in the mid-flank, on the left side, with a sharp knife or lancet, in order to extirpate or cut off the parts destined for conception, and then stitching up the wound, and anointing the part with tar salve. The animal should be kept warm for two or three days after the operation. The usual way is to make the incision in a sloping manner, two inches and a half long, that the fore-finger may be put in towards the back, to feel for the ovaries, which are two kernels as big as acorns, one on each side of the uterus; one of which being drawn to the wound, the cord or string is cut, and in this manner both are taken out.

The usual times for cutting the male hogs are the spring and autumn, and while the pigs are small. The manner of performing the operation is by cutting a little of the end parts of the scrotum or bag off in a cross direction, and then forcing the testes to appear outwardly, so as to be drawn perfectly out of the part with the spermatic vessels, or cords attached to them, so that nothing may remain; a little dry lint should then be kept close to the parts, but no sort of salve or ointment whatever should be used. In a few days, generally, the whole will fall off, and the parts be wholly healed without further trouble.

In the spaying of female hogs the same practice should be had recourse to, though it is too common for tar and other ointments to be applied to the cut parts, which prevent their healing, and often do mischief by the irritation which they produce in the wounds; whereas by the simple use of lint the parts are soon brought to the perfect state without difficulty or trouble.

RINGING, AND PREVENTING ROOTING THE EARTH.

There is a constant necessity to keep all sorts of young and other hogs or swine constantly well rung, in order that they may rest quietly in the sties, and, of course, thrive in a more perfect manner. The operation of ringing the snouts of pigs should be performed at weaning time, after they are recovered from castration; and it will be necessary to renew the operation as they become of large growth; but no pigs, young or old, should be suffered at large unrung. In ringing, care must be taken by the operator that he go not too close to the bone, and that the ring be not too thick, but traverse, or turn easily in the part; and if an error in this respect be committed let it be immediately rectified. Sows in pig should never be rung, as it occasions risk of abortion. The necessity for this operation is sometimes altogether prevented by cutting away the cartilage of the nose, which is the part that turns up the earth, and in doing which there is no danger; but ringing is a more pleasant operation.

Section VII.—*Weaning and rearing young Pigs or Hogs.*

The weaning of pigs should take place before they have sucked too long, as in the sixth, seventh, or eighth month of their age at the farthest, as by continuing to suck longer they are in danger of doing great injury to the sows, as their milk then begins to decline, and the pigs are but little benefited themselves;

since, if properly managed, they will before this time, as directed above, have learned to eat other sorts of food; and it is improper to keep them at the teat longer, as, from the full growth they have acquired, they cannot go on in an equally profitable manner. It is a good practice in these cases to have the sties constructed in such a manner, as that the young pigs which have began to be supported on other food may have distinct and separate divisions, in which they might be put, which would prevent the sow from being injured by their greediness for food, and the weaker pigs from being starved, or so stinted in the growth as to be of little value in their future use. Good food must, however, be continued as long as the sows give suck for the pigs' support, as there is a constant want of profit in such animals when deprived of the requisite full keep. By keeping the young pigs separate and well fed, they will become in the best state of growth and strength at the time of weaning, and the sows will be in such good condition as to be sure of taking the boar again in a few days after the pigs have been taken away from them; by which means full time may be gained for the sows having two litters of pigs in the course of the twelvemonth, which is turning them to the best account.

In taking the young pigs from the sows to be weaned, it is always proper to have them well fed at first with wash formed of flet milk, with a little grain steeped in it, or given dry, and not broken, as they eat it best in such a state. This manner of feeding them should continue for a fortnight or three weeks, when they may be put upon good store keep, in the manner directed below. Other modes are sometimes practised in weaning pigs, such as mixing meals of different kinds with wash or flet milk; but, when there are many pigs, such food is liable to be much wasted, as it is thrown about, and sticks to their snouts and head parts in a paste-like manner, producing much cold and injury by evaporation and other means. Besides, there is a clamminess in the food when so mixed, which is hurtful, and it conveys less nourishment than when it is given in the grain state, and is well chewed by the young hogs before it is swallowed. The pigs by these means become more healthy and free from affections of the skin, such as the scab and others. When fed well in this way for about five or six weeks after weaning, they will thrive and get fat, if required; when others of the same kind, which have been less attended to and managed in other ways, will become set in their growth, and far inferior in their nature and qualities.

The sows, after the pigs have been taken from them for the purpose of weaning, only require to be kept in the ordinary store manner; as, where they are sound in their constitutions, they breed far better and more certainly on such keep than when fed more fully and kept in a state of more fatness and condition.

SECTION VIII.—*Store feeding and keeping Hogs.*

THESE are circumstances of great importance, as the profit and advantages to be derived from such stock, in a very high degree, depend upon proper management in these matters.

In regard to the food of this sort of farm stock, it has been observed that as the breeding of hogs or pigs is a practice that affords the farmer considerable profit and advantage in various points of view, it is of essential importance that he be provided with suitable kinds of keep in abundance, for the support of the numerous sows that it may be necessary for him to keep, and the great number of pigs

that must be raised, as upon this circumstance his success will in a great measure depend.

The crops capable of being cultivated with the most benefit in this intention are those of beans, peas, barley, buck-wheat, potatoes, carrots, parsnips, Swedish turnips, cabbages, lettuces, clover, lucerne, and some others.

The proportions in which these crops should be cultivated or grown must of course vary according to circumstances, as the kind of hogs, their number, and the manner of disposing of them; but whatever number may be kept, an adequate and equal proportion of root crops and those of the grass kind will be requisite, with about half as much of those of the farinaceous or grain kind, as those of the root sort, and a quantity of the luxuriant vegetable kind fully in proportion to the number of hogs that are to be fed on such sorts of food. In supplying the hogs with food a distinction should be made according to the different kinds, in order that the most may be made of such food, whatever it may be. Sows considerably advanced in pig, and those with pigs, should be fed in a better manner than the ordinary store pigs. The former should be supplied with good wash, as described below, twice or oftener in the day, and have a sufficient allowance of cabbages, potatoes, carrots, or other similar vegetables, so as to keep them up in good condition, which will be shewn by the gloss of their coats. Sows with pigs should be kept with the litters in separate sties, and be still better fed than those in pig. Where dairying is practised, the wash of that kind which has been preserved for the purpose, while the dairying was at the height, in brick cisterns constructed for receiving it from the dairy, must be given them, with food of the root kind, such as carrots, parsnips, potatoes, and cabbages, in as large proportions as they will consume them, in order that the pigs may be properly supported and kept in good condition. But where the business of the dairying is not carried on so as to provide wash of that sort, meal of some kind or other must be had recourse to for making wash by mixing it with water and the boilings of meat or other such liquids, which, in the summer season, will be sufficient for their support; and in winter, it must be blended with the different sorts of roots prepared by boiling; or when for the young pigs, with oats, either whole or coarsely ground, and pea soup. With this soup and dairy wash, when proper attention is bestowed, young pigs may be weaned, reared, and kept even in the winter season with profit and success.

In most cases good wash with a little grain of the oat kind to each young hog will be much better and more profitable food than any other matters for the rearing and storekeeping of young pig stock; as from the necessity of such materials being more masticated before they are eaten, the hogs grow faster and in a more perfect manner, and become finer and better stock. This fact should be fully considered by breeders, especially in rearing the best and most perfect breeds and sorts, as much depends upon it.

PEA SOUP, OATS, AND DRY KEEP.

The kind of pea soup described below is an admirable article when given in this intention. It is prepared by boiling six pecks of peas in about fifty or sixty gallons of water, till they are well broken down and diffused in the fluid; the whole then to be put into a tub or cistern for use. When dry food is given in combination with this soup, or alone, oats should be used, as being much better than any other sort of grain for young pigs; barley, or the meal of it, not answering nearly so well in this application. Oats coarsely ground have been found

very useful for young hogs, both in the form of wash with water and the broth of meat, especially if made of a somewhat thicker consistence. But in cases where the sows and pigs can be supported with dairy wash and roots as mentioned above, there will be a considerable saving made by avoiding the use of the expensive articles of oats, barley-meal, peas, or bran and pollard. The farmer should, therefore, cautiously avoid having recourse to such expensive substances, in these circumstances, where less valuable kinds of keep can be made to serve the same purpose nearly as well.

WASH WITH THE USUAL SORTS OF MEALY STORE-KEEPING SUBSTANCES.

In the mode which is usually followed by farmers, the pigs are fed for some weeks after they are weaned on whey or butter-milk, or on bran or barley-meal mixed with water, or the rich liquid in which meat has been boiled. They are afterwards maintained on other food, such as potatoes, carrots, the refuse of the garden, kitchen, scullery, and other places of a similar kind, together with such additions as they can pick up in the farm-yard. Sometimes they are sent into the fields at the close of the harvest, where they make a beneficial living for several weeks on the gleanings of the crops; at other times, when the farm is situated in the neighbourhood of woods or forests, they are sent thither to pick up the beach mast and acorns in the fall of the year; and when they have arrived at a proper age for fattening, they are either put into sties fitted up for the purpose, or sold and sent to distillers, starch makers, brewers, dairymen, or cottagers, in various situations, to be fed out in different intentions.

Swine are sold to the butcher at different ages and under different names; as pigs, when a few weeks old; as porkers, at the age of five or six months; and as full-grown hogs, at from eighteen months to two years old. The young pigs are commonly roasted whole, the porkers are used as fresh or pickled pork, and the full grown hogs for the most part converted into ham and bacon. The demand for porkers, for London in particular, is very great; it continues almost throughout the year, and is chiefly supplied from the dairies within reach of that metropolis. From the time they are weaned they are kept constantly on whey, skimmed or butter milk, with frequently an addition of peas, or beans, or barley-meal. Such good keep not only makes them increase rapidly in size, but renders them fit for the butchers at an early age, which is a point of some importance in getting such stock into the proper state and condition.

It is also a matter of importance in the management of sows and pigs to keep them constantly well littered down with clean straw or some other similar article; as by such means they are kept perfectly clean and healthy, and a larger quantity of manure will also be raised.

It may be noticed, that where the practice of cultivating crops of various kinds purposely for the food and support of swine prevails, the sows and store pigs will of course be supported during the winter season, from the beginning of November to the middle or latter end of the May following, by the various roots mentioned above, and which have been stored for this purpose, in combination with the preserved dairy wash and other articles of different kinds.

It may often be advisable that at the latter end of such periods the whole of the hogs in the yards should be looked over and sorted; and such as have attained half or more of their growth, should be drawn out and turned upon the clover, lucerne, or other crops, where they should be kept till towards the latter end of

September, care being taken that the fences are kept in perfectly good order, and that proper ponds or other places be provided for the hogs to drink at. Under this management, they are found to grow rapidly, the food in general agreeing well with them; and they are then taken up in excellent condition for being fattened. In this system the material difference from the former mode is in selecting the sufficiently grown hogs from the sows that have pigs, and the weaned pigs, and only leaving the latter to be fed with the dairy or other wash, with suitable green food, such as lettuces, cabbages, or tares; by which method a much larger stock of breeding hogs may be kept. The tares and cabbages may be used for the sows that have spring litters, and the lettuces for those that have autumn litters. These plants are of great use for sows, and pigs, promoting the increase of milk in a great degree, affording great assistance where the dairies are small, and in all cases tending to prevent the consumption of grain, which is a circumstance of great importance in hog management. From the sweet juicy quality of the lettuce, it is highly nutritious, and the hogs are extremely fond of it. In this way the swine may be well supported and carried forward till the stubbles are cleared, when they may be turned upon them, and thus be provided for during the whole year with the greatest economy and profit.

SOILING STORE-KEEPING PRACTICE.

Some farmers are of opinion, that although the above system of management be advantageous, that of soiling the hogs in the yards with green food, cut fresh, is, notwithstanding the increased expense of it, and the unavoidable waste of a certain portion of the food, highly preferable, on account of the vast store of manure that may be raised. It cannot, however, be attempted with propriety, unless the farmer be provided with abundance of materials of some sort or other for the purpose of litter; and substances of the peaty or earthy kinds, for the purpose of covering the floors of the hog-yards, in order to absorb and prevent the waste of any portion of the liquid matters that may fall upon them. In this method, clover, tares, and lucerne, are the kinds of food that are most commonly employed; but there are others that may be brought in to their assistance, when necessary, especially on the stronger sorts of land; such as beans eaten green, which afford a large quantity of food, in proportion to the land they occupy, the whole stems being consumed; cabbages also may be had recourse to for the summer, as well as the winter food of these animals. In this view it has been advised, that the yards of the hog-sties should have gates sufficiently large for bringing in carts loaded with the different articles of food, floorings, and litter, as well as for removing the manure that is made in them. In this system of practice, instead of only a few sows being kept, as was usual, in combination with the dairy system, great numbers may be maintained and a great many young pigs be raised. But in order to derive the greatest advantage from it, it should, as much as possible, be so contrived, that the sows pig only twice in the year; as by this means there will never be a long and expensive season for rearing pigs before they are put to the staple food of clover, potatoes, and the like. But this circumstance may be rendered of less consequence, by the provision of crops raised expressly for swine-feeding in the store state.

This is a practice, however, which probably succeeds better where the hogs eat such grasses in the field than in the house.

COARSE GRASS OF THE SOUR KIND.

This sort of keep has been much extolled as a good cheap summer food for young store hogs, where it can be had in sufficient quantity, as pigs are fond of feeding upon this refuse sort of herbage, and there are often many coarse sour-grassed portions of ground that may be very beneficially made use of in this manner, as it is generally refused by all other kinds of stock; the land would also be benefited, and the nature of the grass upon it would be improved. Several improved breeds, which have been tried in this practice, eat such food very well, and were brought into excellent condition by means of it. But further trials are yet necessary, as many sorts of hogs do not like to eat grass, even of the most sweet and juicy kinds, and in the best state. If this practice of turning hogs to graze where no other sort of stock would feed, should be found to succeed to any extent on further experience, much convenience and profit would be the result in many cases, and pigs might be kept where it has never yet been attempted, be more readily raised, and sooner brought forward into the state fit for being fed out in the different intentions as food.

That the nature of the hog would induce it to feed partly on grass, is clear, from what has been said in the beginning of this chapter of the work; but whether those breeds and sorts, which are more improved and removed from the natural state could be brought to feed fully on grass of such a kind, is a matter of no little doubt; if, however, they eat it at all, in any complete manner, it must be in the summer state of it, when it is in the most suitable and nourishing condition, for the purpose of carrying them on till other means of keeping them become in readiness; a circumstance which would be highly beneficial and convenient to the breeders and keepers of such stock in various respects.

SWEDISH TURNIP, AND THE SEED OF THE SUNFLOWER, AS STORE-KEEPING AND FATTENING FOOD.

The Swedish turnip and the seed of the sunflower, may also be used in this way with great benefit. The root of this turnip, from its saccharine quality, and the closeness of its texture, affords more nourishment than many plants and roots of other kinds, and has been found to answer well in the store-feeding of young hogs and swine, being a cheap, convenient, and very beneficial sort of food, and bringing them to the state of good pork, with little or no assistance from other more expensive materials of the grain and meal kinds. In some parts of Oxfordshire, it is used in both these ways with the best success, where the breeds of hogs are of a good and favourable sort for such purposes. The turnips should be given to the pigs in pretty large quantities, frequently in the day, being thrown to them in the yards or other such places, and should be cut when intended for rather young hogs. Perfectly good pork has been produced in the course of two or three months, by being fed upon nothing else but the root of this turnip. The consumption is in proportion to the size and nature of the hogs, but those of the smaller kinds, in general, do the best on this sort of keep.

SUNFLOWER SEED.

The seed of the sunflower has been tried in many cases, and has been found to be equally as useful in this sort of feeding as any sort of grain whatever, when it has been well got from the heads of the flowers and well preserved; and as such plants of the different kinds will grow with much readiness and strength in many situations, where the land is of little or no va-

lue, such seed may be gained at very little expense either of money or labour. Its properties are great sweetness, combined with an oily nature, as in oil-cake or linseed, but with less mucilage, so that its feeding qualities cannot be much doubted; and from the seeds being full as large as those of grain, it must go equally far in its consumption; but from its peculiar nature, it is not improbable, that it will be found to go much farther for this purpose than any sort of grain. When the nature of its growth and use in this way becomes more perfectly known and better understood, it is presumed, that it will be found not only a cheap but a very beneficial sort of food in this intention. The main difficulty is in the preserving the flowers in such a way as that the seeds in the very large heads of the plants may become perfectly ripe and dry for such use. The seed should be used in the whole state, rather than the reduced, for the reasons that have been already stated, as well as on account of the difficulty of breaking of it, arising from its more oily quality.

HAY TEA, OR WASH, THICKENED WITH SUBSTANCES OF DIFFERENT KINDS FOR STORE KEEPING.

It has been lately stated, by Mr. Saunders, of Stroud, Gloucestershire, that he has, with considerable success, attempted the use of hay-tea or wash in the store-feeding of hogs: he was led to the use of this liquid, from considering its effects in weaning calves. In his experiments, the sorts of hay were those of clover, sainfoin, and lucerne; and he thickened the tea or wash, indiscriminately, with grains, bran, pollard, or any kind of meal, cabbages or boiled potatoes, (but carrots, though excellent, he had none,) sometimes adding two or more of these matters, as his stock of either enabled him; and he had the satisfaction to find, that he made a single sack of boiled potatoes, when mixed with wash, and without any other ingredient, go as far as four or five sacks boiled, when he gave the potatoes alone to the pigs; and the expense of the wash, thickened with potatoes, was considerably less than potatoes alone. With the view of showing the practicability of prosecuting the plan upon a larger scale, he gradually increased his stock to upwards of four hundred, and in the course of his experiments he had nearly fifteen hundred hogsheads of wash, consuming, when his stock was at the highest, about five hogsheads daily: and, incredible as it may appear, he maintained them, collectively, at the very low rate of one penny a head per day, in excellent store order, and many of them fit for the butcher. It is deserving of particular attention, that in a week or fortnight after the commencement of his experimental trials, the pigs, which had before been feeding with potatoes alone, improved in their coats, which, from looking coarse, assumed a gloss, and became fine and short; a sure proof of the great nutrition of the food, and of its perfectly agreeing with pigs. Nor was it less remarkable, that this voracious animal, though fed with this food but twice a day, which is preferable to feeding them oftener, would lie down contented for the remainder of the day, provided it was well ringed and had a warm and dry place to shelter under. This circumstance is attributed to the following causes, in addition to the nutritive properties of the wash:—It was found beneficial to store the boiled potatoes in large casks, in which they would keep good above a twelvemonth; and when they had remained in them some time, freed from the water that they were boiled in, which is considered noxious, it was

conceived, that they not only went farther, but that they generated a spirit; and the wash being also, as it is apprehended, of considerable strength, they disposed the animal to betake itself to rest from their soporific and intoxicating qualities, a circumstance evidently conducive to its quicker growth. No objection can be raised to this food, when applied to the flesh of the animal. So far from possessing any pernicious quality, it communicates, perhaps, a richer and more delicate flavour to the pork and bacon than they receive when fed after the common mode, and the butchers and others not only eagerly purchased these pigs, but commonly remarked, that they rapidly improved when put up to fatten. And hence arises another most important consideration, which is, that one sack of meal, of whatever description, may be made to go as far as two sacks in the common mode of feeding or fattening; for, by gradually thickening the wash with the meal, it forms the best introduction to the higher and last stages of fattening, both for pork and bacon: indeed, that method should be followed throughout the process, using the wash instead of water. The increased quantity of a cheap and highly nutritious food, thus administered, will satisfy the voracious habits of this animal, and yield the greatest profit; and this circumstance must cause an immense annual saving of corn, which would tend to ensure plenty and cheapness. For as the price of a commodity, in a great degree, depends on the relative quantity produced, and the regular consumption; to lessen the consumption, therefore, diminishes the demand, and has the same effect as increasing the supply, which must necessarily cheapen the article.

The following are the calculations given of this mode of feeding, premising that clover or sainfoin hay be at 4*l.* 13*s.* 4*d.* per ton, which is 4*s.* 8*d.* per hundred, and one halfpenny per pound; and that twenty pounds of either, well boiled, will make, with the addition of the incorporated ingredients, sufficient wash as food to maintain, throughout the day, fifty store pigs, from three months old to an indefinite age upwards.

The Estimate of the daily Expenses of keeping 50 *Store Pigs.*

	l.	*s.*	*d.*
To potatoes, 2 bushels, (120*lbs.*), at 5*s.* per sack .	0	2	6
— Clover or sainfoin hay, which will give 10 quarts, or 2½ gallons of liquid food to each pig	0	0	10
— Coal, half a bushel, at 6*d.* per bushel, average value	0	0	3
— Attendance, boiling food, serving the hogs, &c.	0	0	6
Total	0	4	1

This is a 1*d.* short of a 1*d.* a head per day.

Potatoes, 1 bushel (60*lbs.*)	0	1	3
Grains, 2 bushels, at 6*d.* per bushel	0	1	0
Clover hay	0	0	10
Coal	0	0	3
Attendance	0	0	6
Total	0	3	10

This is 4*d.* short of a 1*d.* a head, for the day. And with

Potatoes, 1 bushel	0	1	3
Meal of any description, but particularly oatmeal, as being the cheapest, or pollard	0	1	4
Clover hay	0	0	10
Coal	0	0	3
Attendance	0	0	5
Total	0	4	2

This is exactly a 1*d.* a head for the day.

Carrots, either raw or boiled, are excellent, and these, with oatmeal and grains, would make a cheap and good addition. The hay, when put into the furnace to be boiled, should be enclosed in a net, or a basket with a lid to it, or in a tin kettle and cover, filled with large holes, and the potatoes, or the carrots, *&c.*, should be steamed over the tea whilst gently boiling or simmering. This may easily be

done by fitting to the furnace a vessel, having a number of holes of the size of a common auger bored through the bottom of it, so as to allow the steam to pass through the potatoes with which the vessel is filled, and having a little moist clay, or a wet flannel or cloth put circularly round the bottom, where it rests on the mouth of the furnace, so as to secure the steam from escaping. By this mode of steaming the potatoes, a considerable saving will be made in the article of coal. The potatoes should be but slightly steamed or boiled, and not reduced to a pulp, and whilst hot, should be trodden or rammed into casks for future use. The hay, after boiling, may be dried, and perhaps offered to store cattle, or else thrown to the pigs as litter, or be added to the dung-heap. The wash should be carefully given to the pigs in a luke-warm state, and if meal or pollard be added, it should be thrown into the tub or cooler immediately after boiling the wash, and well mixed together; but steaming the meal or pollard, or even the grains, might be a further improvement. The water, where there is a sufficient fall, may be turned into the furnace, without any trouble whatever, by means of a leaden pipe; or may be conveyed into the furnace by a spout from the pump, and the tea may be drawn off through a cock into a cooler, which should be placed by the side of the furnace. To convey the wash to the pigs, an open barrel or hogshead was used, suspended upon a pair of shafts, with wheels to it, and drawn by a single horse.

In these estimates of the expense of maintaining the pigs, it should be further observed, that no credit has been taken for the articles of manure; and thus the pigs will make the farmer a present of the dung, as well as pay him a good price for their keep. Fifty strong stores, with a sufficient quantity of stubble, which is frequently ploughed carelessly into the land, or carpenters' shavings, or saw-dust, or virgin earth, or sand, especially sea-sand, where obtainable, and laid down in the yard, will make, in the course of the year, from two to three hundred wagon-loads of excellent manure: the sea-sand will add saline particles to the manure, and check evaporation. It ought also to be remarked, as a most favourable circumstance, that the hay-tea binds the dung of swine, and renders it hard and black, like sheep's dung; and if it does not produce this effect, it must assuredly be either bad in quality, not properly boiled, or not sufficiently strong; all which particulars should be most carefully attended to, and the state of the dung is an admirable guide in these respects. The hay should always be of an excellent quality; and that which heated least, and contains most of the saccharine juices, should have the preference. Bad hay is certain destruction to the pigs. Clover stands first, next sainfoin, and lastly, meadow hay. Indeed, most of these experimental trials were made, though not by choice, with meadow hay.

POLLARD WITH WASH AND OTHER SUBSTANCES, OR WITHOUT THEM.

The above simple and cheap plan of feeding has been ridiculed and thought lightly of by some who have had but little experience in this sort of live stock, but who consider the grand article of provision for sows and pigs, and for rearing the latter, is that of fine pollard, which, in cold raw weather, is very comfortable to the animals, scalded or boiled, but which is not more so than the hay wash as above. Pollard may be amended by a portion of oat, barley, pea, buck, or any meal, or either of those may be substituted. Wash made of pea-meal alone is sometimes apt to scour young pigs, but

more frequently binds them too much. Skimmed milk, house wash, grains, and such matters of course are often given. If roots or vegetables be given to the suckling sows, or to young weanlings, articles of very questionable use, it is far better and more safe to boil them. In fact, it is vain to think of dispensing with the use of corn, including pollards in that denomination, in pig-breeding or rearing until the pigs be full three months old; but the several other substances become useful in lessening the necessary quantity of grain. The sow has generally sixteen teats, although many of them may be naturally useless; or it may sometimes happen from defect of being drawn by her first progeny, which countenances the practice of suffering a numerous first litter to suck, as by that means all the teats may be rendered productive. It seldom happens, however, that a sow has more than twelve, or even ten, good teats; and it is obvious, in consequence, that she cannot maintain more pigs than she has teats. It is a useless practice to suffer unthrifty pigs to hang upon the sows; they will ever be profitless themselves, and they detract from the worth of the profitable sort. In these cases, it is most beneficial to feed this stock twice a day, and to continue such practice with young growing stores, unless they have much food to pick up.

POTATOES ALONE OR IN THE STATE OF WASH.

These are roots which have often been much recommended for the store keep and feeding of young pigs, but without some other substance of a better kind be made use of at the same time, they seldom answer well for the purpose. They have been fully tried, in many cases, with the best breeds of hogs in the raw state, but without advancing them in any satisfactory manner; or in any way improving them after the animals have been continued upon them for several weeks. But, whether used in the raw or prepared state, they do not seem to have the quality which is useful and necessary in the properly forwarding pigs in the store manner, without being mixed and combined with some sort of better food for the purpose. Those who use them in this intention will, therefore, be much disappointed if they have been led by the common notion that they alone are a cheap and beneficial food in keeping such animals.

BREWERS' GRAINS.

These, with a little wash, are an useful sort of keep for store hogs, and may be preserved for the purpose quite good and sweet, in somewhat the same manner that has been described in the cases of cow-keeping; but between the different layers of the grains as put into the tubs or keeping-places some common salt should be spread, which is found to be of much use in preserving the grains, and beneficial to the hogs. Each layer must be pressed hard down to force off the moisture, and the whole must be kept well covered, in order to secure them from dust and every sort of dirt. They are to be cut out as wanted for the hogs by means of a proper knife, and will thus form a convenient and an excellent food for such use, being both healthy and nourishing.

LETTUCES.

Having mentioned the use of the lettuce in feeding sows and pigs in the summer season, it may be proper to remark that the sowing of lettuces for hogs was first practised in a regular system and manner on the farm of a very intelligent cultivator, not at all a visionary man, in the county of Sussex. There was every year raised an acre or two, which afforded a great quantity of very valuable food for the sows and pigs. Of the nature of the lettuce-

plants, what has been already intimated may be now strongly repeated; which is, that they make the sows yield milk amply, and that all sorts of swine are very fond of them. Every economical farmer, who keeps many hogs, should take care to have a succession of crops for these animals, that his carts may not be for ever on the road for purchased grains, or his granary opened for corn oftener than is necessary. To raise this sort of crop, the land should have been ploughed before the winter frosts, turning in by that earth twenty loads of rich dung per acre, and making the lands of the right breadth to suit the drill machine and horse-hoes, so that in the month of March nothing more may be necessary than to scarify the land, and to drill the seed at one foot equi-distant at the rate of four pounds of seed to the acre. If half an acre, or even a rood, be tried near the farm-yard, the advantage will not be inconsiderable in such use. Where the stock of swine is large, it is considered proper to drill half an acre or an acre of lettuce-seed in April, the land having been well manured and ploughed as directed above, being also scuffled in February and March, and well harrowed, repeating it before drilling in a full manner; and at this period the crop which was drilled in March should be thinned in the rows, by hand, to about nine or ten inches asunder. If this necessary attention be neglected, the plants draw themselves up weak and poor, and will not recover it. Women do this business as well as men. When about six inches high they should be horse-hoed with a scarifier or scuffler, having the hoe about four inches, or at most five inches, in width. With this sort of green food some kind of meal, or other dry meat should be combined, as without it, it is apt to prove very laxative to the pigs.

The sales for lean hogs ought to take place in October, the litters of April being then disposed of as stores, and those of August kept till the same period in the following year, in order to be sold as baconers, when none are fattened on the farm or other place.

EXPENSES OF STORE-KEEPING.

In regard to the expense of keeping all sorts of store swine, it must obviously vary considerably, according to the convenience of procuring their food and the excellence of the management that is pursued. In suckling sows, it has been estimated upon the average at from eighteen pence to three shillings the week; and while in pig, from one shilling to eighteen pence; weaned pigs, at first, from one shilling and sixpence to two shillings and sixpence the head, and afterwards, till they are become fully grown, at from one to two shillings each in the week. Calculations of this sort, however, are liable to much error, and also differ greatly under different circumstances, as to the convenience or difficulty of providing the articles of food or other store keep.

SECTION IX.—*Means of properly fattening Hogs in different Intentions.*

THE fattening of hogs is a business usually performed at two different seasons or times of the year, as in October and February or March; the former is, however, the more principal period.

In this system various substances have been recommended; but those most commonly employed are some of the farinaceous kinds of materials, with skimmed milk, and dairy and other kinds of wash.

GROUND OATS OR OTHER GRAIN.

For the smaller sorts of fattening hogs coarsely ground oats, mixed with these washes,

are excellent. Barley meal and pollard are likewise frequently made use of for the purpose with much success. The meals of peas and beans, when given in sufficient proportions for the purpose of fattening, are apt to heat them too much, and produce a difficulty of breathing when used too largely, so that the other matters are better in such cases.

These should, therefore, be cautiously given to young pigs, whenever they are employed in such sorts of fattening; as in such use, when given in very sparing quantities at a time, they are of great benefit in pushing on the hogs in the best and most rapid manner, in combination with good wash of some kind or other.

PEA AND BEAN MEAL.

For the large or full grown hogs, pea meal, or pease unground, is probably the best material that can be made use of. A portion of bean meal or beans may likewise be given occasionally with advantage; as both these articles contain a much larger proportion of nutritious matter in the same bulk, according to Darwin, than any sort of grain, and are more lasting in their effects on the system, from their undergoing the process of digestion more slowly, perhaps also on account of their containing a larger proportion of oil in their composition.

They are by far the best for this use when given to the hogs in the mixed state, and as much varied in their kind as can be conveniently done, some bulky distending dry food being resorted to at the same time to keep the stomach, which is of the simple unruminant kind, in a proper state of distention.

In fattening hogs the meals should be made into hard balls of about half a pound weight each, by means of water, as in that way they go the farthest, and are the most effectual for the purpose. The animals eat freely of such balls at first, consuming about eight or ten daily at the beginning, but after a little while declining to six or seven. The balls are quite hard, as they have nothing in them but water besides the meal, which forms a paste that holds well together. They should be given twice or three times in the course of the day, and of different sorts of meal, as the change of food has a particularly good effect in promoting the fattening of the hogs. Pure water should likewise be supplied in a full manner, and the troughs and other contrivances out of which they eat should be kept constantly well washed and cleaned out daily. When any of the balls are left uneaten by the feeding hogs, they should be taken away and given to others, or those in the store state. The sties and yards should be swept clean out every day or two, and when the hogs get heavy, planks should be put for them to stand upon, so that their feet may not be hurt by resting too long upon the stones or bricks of the floors. The bedding should every two or three days be shaken up and renewed, the pigs being let out at the time into the yards or some other open places, by which means the sties are kept more sweet and clean, which is of material use in the fattening process. They may also occasionally, when in an itchy state, be well washed over with soft soap and warm water, by means of a soft brush, which is very pleasant and refreshing to them; and they afterwards increase rapidly in weight. This was the usual practice followed more than sixty years ago in the northern parts of Lancashire, no other mode being found equal to it in the fattening out all sorts of hogs; and the same practice still continues with equal success and advantage. It is, perhaps, the most economical and cheapest method that can be had recourse to in such intention, as there is less loss sustained in the food, and less labour or trouble

required in the care of the animals by this method than by any other sort of management.

MALTED BARLEY.

Malted barley, given whole, is considered highly beneficial in the fattening of hogs, the sweet nutritious matter of the grain being thus greatly augmented by the malting process.

When, therefore, grain is somewhat spoiled by wetness, or other such causes, it may be turned to account, and will be found greatly beneficial in this sort of application, as bringing the hogs in a quick manner to their full and perfect states of fatness.

ACORNS AND BEECH MAST.

These, in the natural and same state, have likewise been found to fatten hogs well, but they cannot be depended upon as a food for this use, except when they are very abundant; but they then make as good pork and bacon as any sort of grain whatever. In Hampshire, Gloucestershire, and some other of the forest districts, beech mast and acorns are much used, not only as food for hogs while rearing, but also as a means of fattening them. In the former case the hogs are driven into the woods and allowed to forage for subsistence for a a considerable part of the year, as well as in autumn; in the latter, those intended for slaughter in the end of the year are brought home from the forests soon after the fall of the acorn and beech mast is over; they are then put into sties, and their fattening is completed with the same sort of food, a great quantity of which is collected by poor people and sold to the farmers, who use it for this purpose with an addition of peas, beans, or barley-meal.

There are many absurd prejudices against the meat that is produced by this sort of food, but there is reason to believe it to be quite as good as that raised by peas and beans, or meals in the mixed state, there being no sort of difference found in the nature of the meat for any purpose whatever. This has been proved in too many different trials to be in the least disputed.

These are substances that have long been known to give condition to swine; and with such additions, there can be no doubt of their rendering them perfectly fat, and producing the better sort of pork and bacon in many sorts of hogs, giving that sort of firmness and solidity which is considered an excellence in the meat.

POTATOES AND CARROTS.

These have also been occasionally tried in the same application; but as they never answer well without being boiled and combined with the meal of some sort of grain, it is a much better and more economical practice to convert them to the purpose of store feeding, and depend upon farinaceous substances for fattening the animals.

DAIRY FOOD AND WASH.

The dairies are the great sources whence the butchers draw their supplies of hogs as well as porkers. For just as the dairies are employed, either in the making of butter or of cheese, so whey mixed with barley-meal or skimmed and butter milk, are the chief sorts of food on which the hogs on a dairy farm are fattened. Many are the incidental additions daily made to the stock of provisions of this kind that are set apart for the fattening of hogs; in short, every sort of offal from the dairy, the kitchen, and other places, is thrown into the troughs; but milk and whey or barley-meal, with an allowance of peas and beans, for a few weeks before they are killed, constitute the chief articles of food given to the fattening hogs on all dairy farms of whatever kinds they may be.

In those dairy districts where pigs form part

of their systems of management, they are often bought in as stores, and made fat by the whole of the flet-milk, with meals of some kind or other, mostly those of the barley kind; and they are then sold off as porkers, or for bacon, in the autumn, winter, and until the spring. The breed usually employed in such districts is that of the Berkshire, as feeding the most kindly, becoming of a rather large size, and answering these intentions the most perfectly in every way.

There can be but one opinion of the sweetness and goodness of these kinds of food for fattening hogs; but it is probably more fitted on the whole to the less sized than the very large kinds of hogs, and they are generally supposed to give the finest and best kinds of pork that is produced by any sort of feeding and fattening whatever.

DISTILLER'S WASH AND OTHER SUBSTANCES.

Very great numbers of hogs are annually fattened in the distilleries of various parts of the kingdom. In the county of Surrey, between nine and ten thousand were formerly fattened on the grains, wash, and other offals of only three distilleries in that district, in the same length of time, but the practice is now much given up. From this fact, some idea may be formed of the total number of hogs thus annually made fit for the butcher. In the first stage of this sort of fattening, they are only allowed grains and wash; but for some weeks before they are ready for market, they are allowed, daily, a certain quantity of meal or grain; which addition not only brings them faster forward, but renders their flesh firmer and better adapted for curing as salt provisions, the use to which the meat is for the most part applied. It is an error which ought to be corrected, as it is too much believed by the vulgar, and those not well acquainted with the matter, that the malt distiller's pork is not good in quality, because the hogs are supposed to be kept in a state of intoxication; whereas the contrary is the fact, it being notorious, that the best pork for sea voyages is that from the malt distillers, who always finish them with hard meat; and it is equally certain, that the best bacon in the kingdom is made from those hogs; and the distiller would be a very bad workman, who left spirit enough in the wash to make the hogs drunk. It is a strong refutation of this error, that the hogs fattened at the distilleries fetch the same price both at the bacon merchants, and Victualling-office, as those that are fed under any other system of management whatever.

There is no reason for supposing that the flesh of hogs is in any way whatever injured by being fed in large works of this kind, but it is only the large and more heavy flat-sided hogs that are capable of being so fattened; and they may, of course, be somewhat less fine and delicate in the grain of the meat, though more juicy, and better for the purpose of salting than the small and more delicate pigs.

REFUSE OF STARCH-WORKS AND MILLS.

Of all the modes in which hogs are fattened, that which is adopted at the corn-mills and starch-works is perhaps the best; the foods on which the hogs are fattened being the refuse of grain, which is quite free from any nauseous mixture; it is also more nutritive than any other that is applied to the same use in the same proportion.

The various refuse matters of all such works afford a very excellent sort of food for fattening the large as well as the small sorts of hogs; but they are not by any means better than those of the grain kind in the unreduced state, but, on the contrary, are, for reasons that have

been already stated, less quick in giving perfectness to such hogs.

USE OF PIG-CASES, OR CAGES, IN FATTENING HOGS.

In some parts of the county of Essex, a practice has been recently introduced, which was first tried, it is believed, by Mr. Pattison, of Malden, of fattening the larger sorts of hogs in separate stalls, so constructed that the animal can at his pleasure conveniently rise up and lie down, but cannot turn round. It is supposed that they will thrive in this manner faster than in any other way: they are certainly fed by these means more cleanly, as they cannot get at dirt or filth of any kind; the stalls they are in are paved upon an inclined plane from the head to the tail of the animal, and they are cleaned out every day, by means of a hoe and broom. Barley-meal, mixed with water, forms the food, and the above farmer has found the improvement so great, that he will engage that a pig forward in flesh, weighing 70lbs., shall, in twenty-eight days, increase in weight to 140lbs.; the gain of 70lbs., live weight, may be called 45lbs. dead, which, at 8*d.* per pound, is 30*s.* or 7*s.* 6*d.* a week. This is a very considerable gain, and affords sufficient reason for conceiving that the method is a real improvement.—See the subjoined *plate*. The quietness of these cases or sties causes them to fatten more quickly, as they have only to eat and sleep. These are the principal modes of fattening these useful animals, that have hitherto been put in practice.

In Sussex, a trial of this sort was made by Lord Egremont, by confining the hogs in a sort of case or cage of this kind, exactly fitted to the sizes of the animals, and which were capable of being augmented as they became larger, so that no more room was allowed them than what was merely sufficient for them to lie down upon their bellies. Some of the hogs being intended to be kept over the summer, seven of the largest were put up to fattening in the latter end of February, being fed with barley-meal, of which they had as much as they could eat. Some days after which, in consequence of a particular circumstance being noticed, the trial as below was suggested:—"A hog nearly of the same size as the seven, but which had not been put up with them, because they appeared to be rather larger, but without weighing them, was confined, on the 4th of March, in a cage formed of planks, of which one side was made to move with pegs, so as to fit exactly the size of the hog, with small holes at the bottom, for the water to drain from it, and a door behind to remove the soil. The cage stood upon four feet, about one foot from the ground, and was made to confine the hog so closely, that it could only stand up to feed, and lie down upon its belly. It had only two bushels of barley-meal, the rest of its food was boiled potatoes: they were all killed on the 13th of April, and the weights were as follow, 8lbs. to the stone;

CONFINED HOGS.

	st.	*lbs.*
Hog in the particular cage	13	2
Other hogs, same breed .	12	2
———	12	3
———	11	2
———	11	4
———	11	4
———	11	2
———	12	2

The hog in the cage was weighed before it was put in: alive, 11 stone 1 pound; it was kept five weeks and five days, and then weighed alive 18 stone 3 pounds; it had two bushels of barley-meal, and about eight bushels of potatoes. It was quite sulky for the two first days, and would eat nothing."

From this result it would seem probable, that the great superiority of this hog in fatten-

ing, arose from the circumstance of the confinement, which is consequently deserving of further attention in the fattening of such animals.

WEIGHT OF MEAT OR PORK AFFORDED BY DIFFERENT SORTS OF FOOD IN FATTENING.

The quantity or weight of pork produced by a given quantity of pease, beans, meals, or other materials employed in the fattening of hogs, has not been well ascertained; and it is probable that a great deal will depend upon the size, breed, and disposition to fatten, in the hogs: but, judging from the weight of the animals before and after they have been fattened, it has been supposed, on good authority, that a Winchester bushel of the first of the above articles may add about nine or ten pounds to the weight of a good hog of twenty score, or perhaps something more upon a larger, and considerably less upon one of a smaller, size. That a hog, when put up to fatten in good condition, (and they should never be put up in the contrary state,) which, when fat, will weigh twenty score, will consume in the proportion of six or seven bushels of pease, or other similar materials as food.

The produce of the native Devonshire hog, crossed with the Hampshire or Leicester, will double its weight in about twelve weeks if fed in the following manner: begin with two-thirds of boiled or steamed potatoes, and one third of pease and barley ground in equal quantities into meal and well mixed together. The mess must be seasoned and enriched with the meal as the appetite of the animal may require, and when fat it will be found to have consumed from fourteen to sixteen bushels of ground pease and barley. This breed, again crossed with the Chinese, will fatten in two thirds of the time, when it will be found to have nearly if not quite doubled its weight also. It has been further noticed, that the proportion of fat to lean, or in other words of pork to bacon, in the above breeds may be thus stated: the Devonshire country hog, when well fed, will produce for one pound of pork one pound and a quarter of bacon. This crossed with the Leicester or Hampshire breed will produce for three-quarters of a pound of pork one pound of bacon. This cross again varied by the Chinese will, in two-thirds of the time, produce for two-thirds of a pound of pork one pound of bacon. The breed, therefore, seems to have much influence in these respects.

In Sussex, hogs are fattened upon barley, pease, oats, or potatoes; the two first are frequently given in mixture, and five sacks of barley and one of pease will mostly fatten a hog of sixty or seventy stone weight: one bushel of pease to four of oats and four of barley, or from three to four bushels of potatoes, with two bushels of ground oats and barley boiled, have been found a good mixture for the purpose. An average sized hog of about fifty stone weight will eat two bushels in the course of a week, and if a fair thriver, will gain two stone in the course of that time. Many experiments have been made by Lord Egremont with different sorts of hogs, in the view of determining the most profitable sort of food for the purpose, which has been determined to be barley; and the white English hog for store keeping, and grazing to be the best sort that has been tried. These kinds of hogs were killed after summer grazing in large park grounds, which was proved to be the most beneficial mode; no corn was given, nor any other food than grass. The hogs were turned out in May, and brought to the slaughter-house in October and November, when they died good porkers.

In a short compact fine-boned pig of the

mixed Essex and Suffolk kind, which weighed about thirty stone when put up for fattening, the increase at different lengths of time in the process were these:

Pig weighed		*Gain in first Fortnight.*
	lbs. st. lbs.	*lbs. st. lbs.*
Oct. 10.	295—36 7	
—— 24.	333—41 5	38—4 6
Nov. 7.	367—45 7	34—4 2
—— 21.	378—47 2	11—1 3
Dec. 5.	391—48 7	13—1 5
—— 22.	*killed.* 48 6	*lost* 1

This shews not only the increase, but the most proper time for killing the pigs, and that should always be when they first begin to decline in their weight, which, in this instance, was after the first fortnight.

	£	*s.*	*d.*
In this case the first value of the pig was	0	14	0
Food provided for it for twenty-six weeks	1	12	6
Pease, two bushels, for about one month's consumption	0	17	0
Barley, two quarters three bushels, at 45	5	6	10½
Grinding the same	0	6	4
Amount of expenses	8	16	8½

st. lbs.				
40 7 of pork, at 6s. per stone	12	5	3
Expenses	8	16	8½
	3	8	6½

The attendance and the rich vegetables consumed by the pig before the time of being put up for fattening are not charged in this estimate.

Good breeds and sorts of fattening hogs have, it is said, been found to increase ten or twelve ounces or more sometimes in the day, especially towards the latter end of the process, but the usual increase is much less; probably, in many cases, not half so much at any period of it. They, in common, gain less in the latter than the more early stages; but, in some instances, the contrary may be the case. Hogs, in general, too, feed better and more quickly when alone than when many are together in the same sty. Hogs, in the fat state, not unfrequently are destroyed by being removed in any shaking or jolting manner, whether in carriages or other ways, the cause of which may be suffocation in some cases; but in others some have supposed that it may arise from the great load of internal fat in different parts, having the skinny covering broken by such means.

MODES OF GIVING THE FOOD.

As to the method of giving the different materials that are employed in the fattening of swine there are different opinions entertained; some contending that they should be used as much as possible in a solid form, wash as drink being occasionally used; while others contend that the contrary method is more beneficial, as less time is spent in feeding, and, of course, there is more time for the hogs to sleep and rest; besides which there is a saving of food and labour, considerations which may probably render the latter mode the more advisable.

Some farmers are of opinion that the most profitable method of converting corn of any kind into food for hogs is to grind it into meal, and mix it with water in cisterns, in the proportion of five bushels of meal to one hundred gallons of water, stirring it well several times a day, for three weeks in cold weather, or for a fortnight in a warmer season, by which time it will have fermented well and become acid; before which process it is not proper to be given. The mixture must always be stirred immediately before feeding, and two or three cisterns should be employed in succession, so that no necessity may occur of giving it before it is duly prepared. Pea-soup is also an excellent food for hogs, and may (though it has not been sufficiently proved) equal the above, especially if given in winter in the milk-warm

state. It must, however, be observed that wherever food is prepared by heat, the expenses of fuel and labour are a great drawback from the profits, which circumstance should, therefore, be well considered before the practice is adopted. But in whatever way the food may be given, great care must be taken that the hogs have a full allowance at sufficiently short intervals, to keep them constantly in a state of rest, as it is on this principle they become fat in an expeditious manner. It is, indeed, frequently observed in fattening hogs, that they pay better for their keep in the latter part of their fattening than in the former, which probably arises, in some measure, from their not being fed in a sufficiently full manner, with sufficient frequency in the beginning in order to keep them in a state of perfect quietude in the sties.

USE OF NARCOTICS IN THIS PROCESS.

The use of opium and other such quieting matters have been sometimes recommended in fattening hogs, but the utility of them is very questionable. There ought to be due discrimination in administering them, for some hogs are so exceedingly sleepy, without the help of opium or any such substances, that they will scarcely rise to feed. It has been remarked, that although acorns will fatten pigs abroad, they will fail in that effect if the pigs be shut up. The writer of a work on cattle made an experiment, in 1788, with two young Berkshire pigs, which he confined in the sty, and fattened upon acorns, to the weight of twenty-five stone each; and, although they handled rather hard, the butcher who purchased them was not clearly aware of the nature of the meat with which they had been fattened. Corn-fed pork is firm, no doubt, from the nature of the food; but this sort of food with grain, properly used, gives as good pork as any other. The same writer thinks it is a questionable point, whether the corn should be ground or given whole; but if in the latter state, it is recommended that something husky should be mixed with it, to ensure mastication, such as oats with barley or peas. Corn is undoubtedly more fully masticated, when consumed in the unreduced state, and on that account is probably the most nourishing for the hogs, fattening them in the least time, and with the least consumption of food.

LENGTH OF TIME IN FATTENING.

With respect to the length of time that is necessary in fattening these animals, it varies much, according to the state in which they are put up, their size, and the difference in their dispositions to fatten; but it is in general from five or six weeks to two or three months. It is of great importance to keep the hogs clean, dry, and warm, during this process, by having them frequently well littered down. The advantage of warm sties, which will hereafter be fully considered, with warm food in cold weather, have also been found to be very great in forwarding this object of the feeder in the most perfect manner.

Pigs are fattened for pork at from six to nine months old; for bacon, from nine to the age of eighteen months: stores, indeed, for some years past, have seldom been kept beyond that age, some few excepted of two years old or thereabouts. The sooner they are ready and in a state to be fed, the more profit they afford.

LIVE AND DEAD WEIGHT.

In a hog of the Berkshire kind, fed with the meal of pease, barley, and oats, for about 190 days, was as below:

	st.	lbs.	st.	lbs.
Weight alive	113	0		
Weight sold, namely,				
Carcass	82	7		
Flay	9	4¼		
Caul	0	6		
Total weight sold	92	3¼		
Weight of crow	0	6¾	95	5½
Fat from entrails	1	4¾		
Sweet-bread	0	1¼		
Weight lost in killing			17	2½

Entrails, maw, caul, crow, fat, and sweet-bread, weighed when taken out of the hog . 71lbs.

	lbs.	
Caul	6	
Crow	6¼	
Fat from entrails	12¼	44¾lbs.
Sweet-bread	1¼	
Entrails and maw	18½	
Weight lost in killing		26¼lbs.
Liver	6½	
Haslet	9½	
Blood	20	
Bladder, *&c.*	3½	
Hair	14	

In another large stag hog of the same breed, when fully fattened, the live and dead weights were,

Live weight of hog, 6 cwt. 2 qrs., which, at 112 lbs. per cwt., is 728 lbs., or 91 stone.

Its offal was,

	st.	lbs.	st.	lbs.
Blood			1	6
Guts			4	0
Flay			6	7½
Caul, sweetbread, *&c.*			0	6
Heart and lights			0	7
Liver			1	2
Crow			0	7½
Loose fat			1	4
Hair			1	6
Pisser			0	2
			20	0
Flay	6	7½	7	3½
Caul	0	4		
			12	4½
Weight of carcass			66	7
Flay and caul			7	4
			74	3
			12	4½
			86	7½
Waste			4	0½
			91	0

In a hog of the Suffolk kind, at nine months old, fed upon barley-meal.

	st.	lbs.	oz.
Live weight	37	4	0
Dead Weight.			
After being slaughtered 24 hours	31	5	0
Blood	0	6	4
Pluck	0	7	0
Rough fat	1	0	6
Entrails	1	2	0
Feet	0	1	8
Hoofs and hair	0	2	4
Loss	1	3	10
	37	4	0

In the mixed Western Essex and Suffolk sorts, killed at less than a twelve-month old:

	st.	lbs.
Live weight	48	6
Carcass weight	40	7
Head	1	1
Fat, *&c.*	1	7
Feet	0	1½
Pluck	0	5
Entrails	1	5
Blood	0	6
Hoofs, hair, and loss in killing	0	13½
	48	6

Section X.—*Proper Sties, Yards, and Feeding Houses.*

It is of great consequence both in respect to economy in the labour of attending to the swine, and in the raising of a large proportion of manure; and also of great advantage to the hogs to have regular and convenient piggeries upon an extensive scale, which should contain separate apartments for every description of stock, with offices for boiling and stowage, cisterns for containing wash and all other necessary conveniences.

Houses of this kind should be made in dry places for the swine to lie in, with small areas before and troughs to hold the food. They are best constructed with shed-roofs about six or seven feet wide, with height in proportion. In order that they may be convenient they should

be at no great distance from the houses, and the less they are connected with the other farm buildings the better. In some cases it might be useful to have them connected with the scullery, in such a way as that all sorts of refuse articles might be readily conveyed to them by pipes or other contrivances. If at a distance, they should be so placed as that the servants need not enter the farm-yard in feeding the animals or cleaning them properly out. Where the hogs are numerous, the divisions should be proportionably extensive for keeping the different sorts separate and distinct from each other. Though swine are generally considered as filthy animals, there are none, as has been before observed, which delight more in a clean and comfortable place to lie down in, and none upon which cleanliness has a better effect with respect to their thriving. In order to keep them dry, a sufficient slope must be given, not only to the inside places where they are to lie, but to the outside areas, with proper drains to carry off all moisture. The outsides should also be a little elevated, and have steps up from the areas of at least five or six inches in height. Hog-sties should have several proper divisions, to keep the different sorts of swine separate, as just stated; but many hogs should not be allowed to be together, for it is found that they feed better in small numbers, and of equal size, than when many are put together of different sizes. Proper divisions must, therefore, be made; some for swine when with the boar; others for brood swine, with proper places for them to farrow in; for weaning the pigs; for keeping the store pigs; for fattening, and for other purposes. It is very advantageous to keep the different sorts separate from each other. When convenient, the areas should always be large, and should have plenty of water conveyed to them, for many useful purposes.

It has been suggested, that every pig-sty should have a rubbing-post, from the following circumstance:—A farmer having occasion to shift two hogs into a sty, with a post accidentally put up in it to support the roof, observed that the animals, when they went in, were dirty, with broken ragged coats, and with dull heavy countenances. In a few days they cleared away their coats, cleaned their skins, and became sleeky haired: the enjoyments of the post were discernible even in their looks, in their liveliness, and their apparent contentment. It is not, indeed, probable, that any animal should thrive while afflicted with pain or uneasiness. Graziers suffer single trees to grow, or put up dead posts in the fields, for the cattle to rub themselves against; and yet a rubbing-post has perhaps never been placed intentionally in a pig-sty, though, for a two-fold reason, rubbing is much more necessary to swine, being highly useful as well as agreeable to them.

It is difficult to suggest any particular form of sty that can be generally applicable, as the buildings must constantly be regulated by the nature of the situation and other circumstances. It is, however, recommended, that a piggery, when on an extensive scale, should be in a circle, or it must fail in convenience. In the centre, the boiling or steaming-house, with a granary for corn, meal, bran, and other such matters; a range of cisterns in divisions around it, for receiving immediately from the copper or steam apparatus what is necessary, and also by tubes from the dairy; around these a path; then the fence-wall or paling, in which the troughs with hanging lids, for supplying food directly from the cisterns, on one side, and for the hogs feeding, on the other; a range of yards

next; and another of low sheds beyond; and, last of all, the receptacle for the dung. The potato stores, or pyes, as they are sometimes called, should at one end point near to the entrance, and water must be raised to the coppers and cisterns at once by a pump; and there should be a trough or other conveyance from the dairy to the cisterns, for milk, whey, and all such matters. Such an arrangement will be found very convenient, and the expense need not be considerable. To annex a certain space of grass, or artificial grasses, in divisions, into which the hogs may be let at pleasure, would prove an addition of admirable use, if the spot permit it. Those who do not possess a convenient pig apparatus, can have little idea of the great use of it in making manure. This alone becomes an object that would justify any good farmer in going to a certain expense, for attaining so profitable a part of what ought to be the farm-yard system. In nine-tenths of the farmeries in the kingdom, it is lamentable to see so many parts of a piggery scattered and unconnected, in such a manner as to preclude convenience, increase labour, and prevent dung from being made in that excellent and extensive manner that it might be.

Such a hoggery as the above may be raised and built in most places, where materials are at hand, at the expense in the several parts of about 70*l*.

Sties of this kind may, however, in many cases, vary in the cost to some considerable amount, according as they may be built.

It is evident, that by means of these yards, great numbers of hogs may be fattened with only one man to attend them, where many more would be necessary without such conveniences. And that with the full and proper quantities of litter which they ought to have, there would be a very great quantity of manure raised, and a considerable amount of profit in that way; besides, the utility and advantage of having it always in the farmer's power to fatten, with scarcely any expense of labour, any number of hogs he may please, is prodigious. With such convenience, all the peas, beans, barley, buck wheat, potatoes, parsnips, carrots, and other sorts of food, that are or can be raised on a farm, may be applied to the rearing, feeding, or fattening of hogs; by which means there would be the opportunity of improving the lands to the highest degree, and at the cheapest possible rate.

In the subjoined *plate* is the representation of an improved complete hoggery. Fig. 1, a large prospective view of it. Fig. 2, the ground plan; A A A A, the entrance passage to the sties; B B B B, open pounds, with the troughs as fixed; C C C, the lodging places, with the fattening hatches; D D, the interior passage to the whole; *d*, cisterns for food; E, inner court or yard; F, boiling house; G, granary. Fig. 3, a section of the same through X Y. Figs. 4 and 5, moveable fattening swine cases or cages.

STIES FOR FATTENING HOGS.

In building sties for the fattening of hogs, the more space within certain limits they have, the more favourable for the purpose they will be found, as being more airy and healthy. The cost, of course, is to be well considered; the divisions, if more than one, need not be large, as swine are apt to turn themselves too much in such cases, as has been seen above, and they should be as few as possible; the whole of the front of the divided part or parts are best made so as to be capable of being wholly laid open, when necessary, in order to prevent too much heat being produced, and so as to be closed when requisite. Before these opening

IMPROVED HOGGERY AND FEEDING CONVENIENCES.

Fig. 1.

PROSPECTIVE VIEW OF THE PIG-HOUSE.

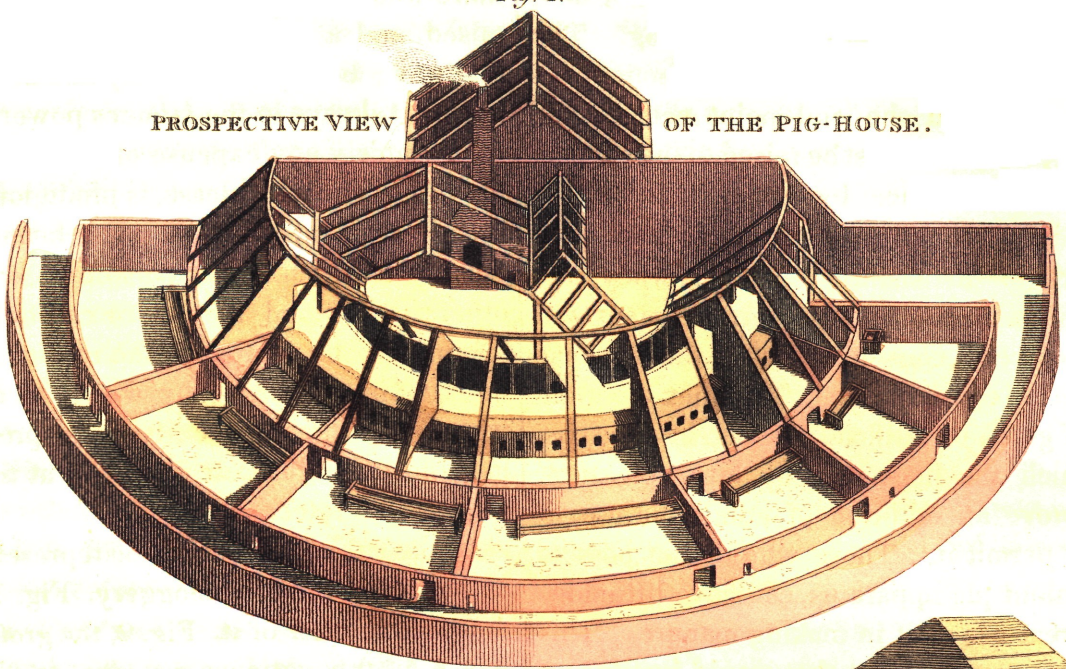


Fig. 4.

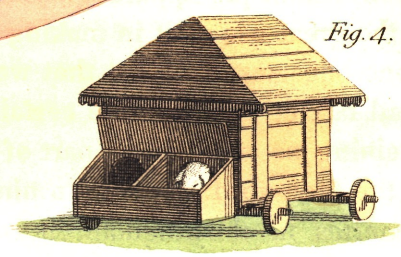
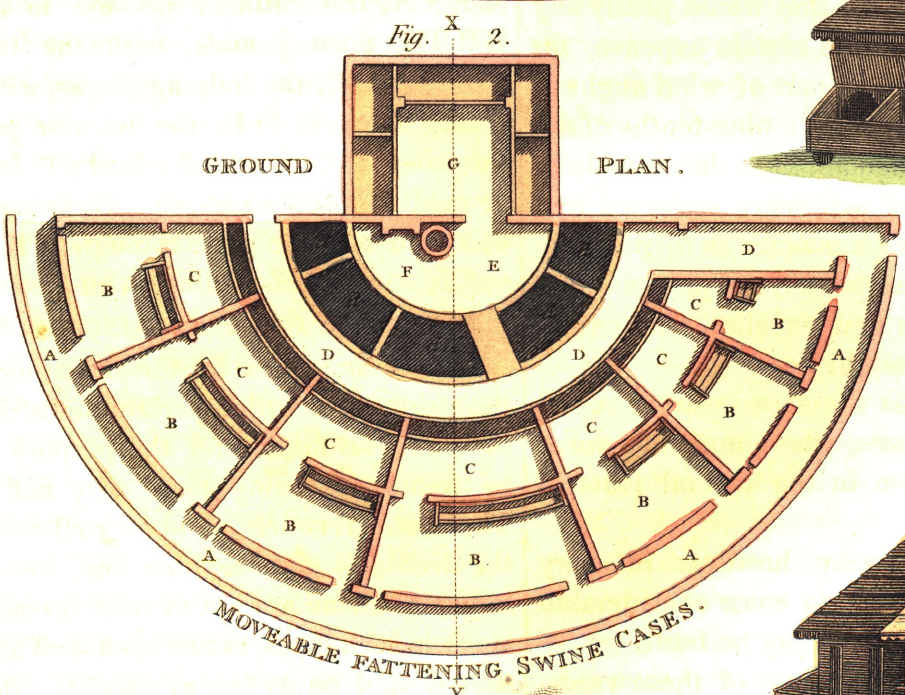


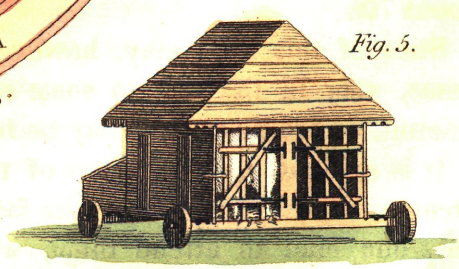
Fig. 2.

GROUND PLAN.



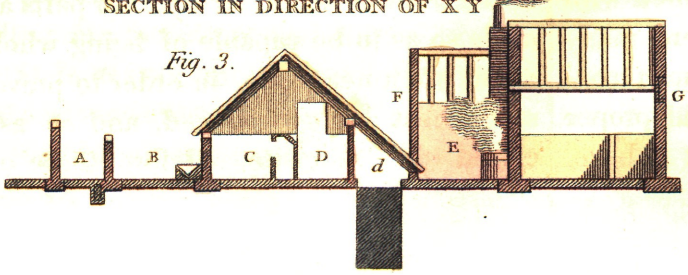
MOVEABLE FATTENING SWINE CASES.

Fig. 5.



SECTION IN DIRECTION OF X Y

Fig. 3.



10 20 30 40 feet

Scale for the 2d & 3d Figures.

London Published by Thos Kelly, 17, Paternoster Row, Octr 25, 1823.

parts, there should be a pretty large area or yard, having its aspect towards the south-east, for the purpose of the sun from the morning being the most upon it, which is favourable to the hogs in this state. The floors are best laid with brick, or other such materials, placed in an edgewise manner, and so as to lie in a properly slanting state from the enclosed parts to the outsides of the yards, as well as in them. And as rubbing-posts have been suggested as proper in other sorts of sties, they may be here more particularly so, and may be formed by erecting two posts with a bar firmly fixed betwixt them, so as to be raised or lowered as the size of the hogs may require; which posts will afford the fullest means of rubbing, which is highly grateful to the animals; and has the effect of promoting their expedition in fattening, by rendering them less restless, and causing them to lay in a more easy and quiet state. In such houses no wetness should be admitted; they should, therefore, have spouts for carrying the water off the roof parts all around them, and thus prevent its falling on the hogs, and rendering the dung in a better and more perfect state for use as manure. As the hog generally deposits its dung and urine at a distance from the place where it lodges; large yards are highly useful for the purpose of keeping the resting places clean and sweet. For though smells cannot have much, if any, effect or influence, particular substances, when eaten, may and probably have, notwithstanding they undergo a complete change by the action, of the stomach, and are formed into quite new matters by the glandular and other organs through which they pass, before they are converted into blood, or form the flesh of the animals. When any such influence, therefore, is given by food of any particular kind, it must be very slight, and scarcely can be hurtful, except when the animal is killed while such sorts of food are in an undigested state in the stomach, when there may be an ill flavour given to such meats, which is not carried off by the different secreting organs. This effect is evident in many cases, but especially in eating asparagus, when a particular smell, and probably also taste, are given to the urine; and the same effect is more extensively and fully demonstrated, by the different matters used as the food of hogs or other animals.

TROUGHS FOR THIS USE.

The troughs which contain the food of hogs, are constructed in different ways, and are of different sorts of materials, according to circumstances; but wood or stone are the most common, though cast iron has lately been applied to this use. It has been well observed, that swine are apt to spill and waste a great deal of their meat, by putting their feet among it, unless proper precautions are taken to prevent them; which may be done by making a rail or covering of thin deal, sloped from the back part of the trough towards the fore part, leaving just room enough to admit their heads. There should also be divisions across the troughs, according to the number of swine, in order to prevent the stronger driving away the weaker. These divisions need not extend to the bottom of the troughs; but should rise a little higher than the top, and may be made of pieces of board, about eight or ten inches broad. Another plan to prevent them wasting their food is, to have shallow vooden troughs placed about a foot from the ground; and above them, large deep troughs open at bottom. In the upper trough the meat should be put, and as no more can get down than what rests in the bottom of the shallow trough, when that is eaten up, a fresh supply will always succeed from the upper trough. But for food of a liquid

nature, such as milk, whey, and the like, there may be a stone trough below, and holes in the bottom of the shallow trough to let it pass through. Troughs of this kind may be made to serve two divisions at the same time, by being placed betwixt them.

Whenever peas, beans, or other such substances, are to be given, these troughs should be formed with a sort of box for holding such matters, with a small opening in the bottom part, and a little trough put below it for the hog to feed from, the hole in the box being merely sufficient to let such a portion pass, as can be taken up at once by the feeding hog, by which contrivance, not only will waste be prevented, but the food will be better chewed and reduced by the teeth of the animal, which is material to the fattening of the hog, which has not a ruminating stomach. If there be not a spring of water running through the sty, which is most desirable, there should be a trough, or low tub, fixed for the purpose of holding clean and pure water. It should have a small hole in some convenient part of the bottom, for the purpose of letting out the foul water and cleaning the trough. It should be out of the enclosure of the yard, in order that the water, when discharged, may not inconvenience the hogs, or dirty the yards, which should always be kept dry and perfectly in order.

In this manner hogs may be more readily and economically raised, fed, and fattened, than in any other that can be adopted for the purpose; and the greatest profit and advantage that can in any way be obtained from such kinds of live stock may be thus ensured to the farmer and the breeder.

HOG CISTERNS.

These conveniences, which contain the food that is necessary for feeding swine, should be built in as convenient a situation as possible for the dairy, kitchen, and hog-yard, and so constructed that no loss may be sustained by its leaking, or letting out the more liquid matters. In Norfolk, hog cisterns are principally built with bricks and terrace. These materials are expensive; but it should be remembered, that a hog cistern is among the first conveniences of a farm-house. Wooden vessels are incommodious, and leaden ones dangerous; stone is probably the best material for the purpose. The following circumstances are worth notice, in connexion with this subject:—One dry summer, a receptacle for water being wanted in a brick-yard, it was determined to build one of bricks, laid in clay, and surrounded with a coat of the same material. It held water perfectly. In consequence of this success, a hog cistern was built in the same manner, and it was declared, not only by the tenant of the farm, but by his wife and the maids, that they were fully satisfied with it, and that it was perfectly well calculated for such use. It was built in the following manner:—A pit, five feet and a half long, by four feet wide, and five feet deep, was sunk in a place most conveniently situated for the dairy, kitchen, and hog-yard. The bottom of the pit was bedded with some extraordinary fine clay, fetched from the sea-coast for this purpose, moistened and rammed down; and its surface smoothed over with a trowel. On this flooring were laid three courses of bricks in clay mortar, for which the best of the clay was used, as being the most proper for this purpose; and in such a manner that the joints of one course fell in the middle of the bricks of the course below; the whole being laid longways, not crossed in the usual manner. The sides were carried up half a brick thick, that is, a brick in width, with mortar of fine clay; and in a vacancy left between

the brick-work and the sides of the pit, moist clay was firmly rammed, so as to unite as much as possible the bricks, the clay, and the sides of the pit into one solid mass; carrying the brick and clay-work up together; and beating back such bricks into the clay as were forced forward by ramming. The cistern, when brought up level with the surface of the ground, measured three feet long, two and a half feet deep; consequently, the surrounding seam of clay was not more than four inches thick; and the stratum at the bottom about the same thickness. Above ground, a nine-inch wall was raised on each side, two feet high, with a gable carried up at one end; and on these a span or pitched roof was set, and covered with tiles; the other end being left entirely open as a door-way for entering at. This is an admirable covering for a cistern. A flap, whether it lie horizontally or sloping, being continually exposed to the weather, lets in rain water, soon rots, and, from the manner in which it hangs, is liable every day to be split, and have its hinges forced off by the carelessness of servants; whereas a door, having only a gentle fall, and being always under cover, will last a number of years without becoming rotten or getting out of order.

Where large stocks of hogs are kept, there ought to be several different cisterns of this or some other sort in order to have the food properly prepared, and preserved in due quantities. They are also highly convenient for mixing the food.

SECTION XI.—*Propriety and Utility of Hogs in Fold-Yards and other such Places.*

IT has long been a matter of much uncertainty how far hogs may be admitted with benefit into such yards or places, though it has been lately contended that vast benefit may be reaped from the practice in many different respects. The most material points which appear to sanction this opinion are, that the hogs are in part kept by the grain they may pick up in such yards, and that the litter of such places being rooted and turned about by the hogs, the rotting of it for manure is more quickly and better performed; but there is, probably, less advantage and utility derived in these respects than is supposed. In the first place, where the thrashing has been properly performed, and it is always a great loss to have it otherwise executed, whether done by the machine or the flail; there is no grain to be found or eaten by the hogs that can possibly have any good effect on them in the way of keep without other food; and by the routing up, turning, and tossing about, of the littery parts of the materials that are thrown about in the yards, there can be no increased use in the forwarding of the rotting or decomposing process of such hard strawy substances, but in many cases, in dry windy states of the weather, a very great disadvantage and delay of the naturally decaying operation, in all such cases. Therefore, there does not seem to be any utility in either case for having such kinds of stock turned into such yards; but there is a great slovenliness and want of proper management in having the dung and littery floorings of them run into heaps, laid open, and exposed to the winds, heats, and drying states of the weather by hogs.

Where, however, such rooting practices are to be pursued in farm or other yards, the larger breeds or kinds of hogs should be preferred, as they are considered more able and more disposed to force, lift up, raise, and mix together, the littery matters, and blending them more perfectly; and are also better for finding the grain which are by some farmers

considered of great consequence, as, although the hogs, hens, and other such animals, have wrought over such materials, some grains will still be found at the bottom, which will sprout on being carried out into the fields as manure. Such, however, would be the case whatever number of hogs were daily turned into them, or however full of poultry or other such stock they were kept, as such vegetating grains are too much mixed up, covered, and concealed in the ears of the corn, to be found even by the quick-sighted eyes of the fowls, which are in the habit of picking them up every day in other places. The small finer sort of hogs would be much too weak and indisposed for such important yard-rooting practices which are believed by some persons to be so useful, and at the same time so compatible with the due order and regularity of such enclosures; without which half their advantages cannot be gained by the farmer, whether pig-breeder or not.

Whatever advantages may result by thus using some refuse food of the granivorous or other kinds, or from thus breaking and reducing the strawy substance of whatever kinds, no benefit is derived by the swine either in preventing diseases, or in any other way whatever; but the practice must rather be hurtful to them by giving them habits of laying out of the sties, and producing want of regularity in their feeding. The best management of hogs is unquestionably that of keeping them well fed at all times in proper sties with large yards, as directed above, as in such manner they go on best, and rise to the largest and finest hogs. The circumstance of merely lying on litter can never be productive of disease, or any sort of harm, to pigs; but the want of it, either in the whole or partially, and the defect of cleanliness and sweetness may cause much injury in many ways, and of course greatly diminish the profits of raising and keeping hogs in many different respects, that cannot be well conceived by those whose experience in the breeding, rearing, feeding, and keeping, such stock is but small and confined to some particular sorts.

Section XII.—*Diseases of Hogs or Swine.*

Swine are subject to many disorders. The state of their health is to be estimated by their cheerfulness, by the gloss upon their coats, and by their skin being whole, and free from eruption. If pigs *bark* (snort) on being alarmed, it is an excellent sign of sound health amd good keep; but it is an extremely unfavourable indication when the head hangs down, the snout approaching the earth like a fifth leg, and when the flanks heave and are hollow. Sick pigs will eat, and they will take medicines in their wash.

CATARRHAL FEVER, or DISTEMPER.

This complaint requires the same comfortable mode of treatment as a quinsy, as the disease arises from too much exposure to cold and wetness, with severe northerly or easterly winds, being attended with a snuffling tightness in the breathing, and a loss of appetite for the usual food.

The appearances are these: the head is hung down in a drooping manner, and often turned on one side; they run quickly, stop suddenly, become rather giddy in the head, and sometimes drop down with much shivering and uneasiness. It will seldom be necessary to have recourse to bleeding, except when the fever or affection of the throat and lungs are considerable; but when necessary they may be bled under the tongue, in the ear, or under the tail a little below the rump part. The disease, however, will generally give way to the medicine directed below, which may be

put among some thickish wash in the trough of the hog once or twice as may be necessary.

Take of—Antimonial powder five or six grains,
Powder of contragjerva ten grains,
Liquorice powder two drachms; mix them into a powder for use as above.

The bowels of the pig, when confined, should be opened by laxative food and a little powder of senna, which may be thrown into the feeding-trough as necessary. These means with plenty of liquid wash will generally be all that is necessary.

INFLAMMATION OF THE LUNGS, OR HEAVING.

This is one of the most fatal diseases that pigs are exposed to, as it affects the lungs as well as other neighbouring parts in a severe manner, and often goes through the whole stock at the same time, and destroys many.

The appearances are, much inflammatory tightness, with a hurried difficult state of breathing, and frequent husky heavings, and coughings early in the morning; the animals appearing dull, heavy, and restless, with little inclination to feed. It sometimes is caused by the nature of the breed, sometimes by the quality of the food, and from various other causes.

This disease, like that of the unsoundness of the liver in lambs, is supposed to be hereditary, but is often the consequence of colds from wet lodging or of hasty feeding in a poor state; in a certain stage it is highly inflammatory and without remedy.

In such cases, bleeding and such means as speedily open the bowels when constipated are the chief remedies to be depended upon; the bleeding on these occasions should be effected in some of the veins in the upper part of the mouth, near the front where it can be easily performed, as the most blood will be drawn in that way; cutting the ears or tail will be of little use, as the quantity of blood thus taken is small. After proper bleeding, the bowels may be opened when much closed by the use of the powder as directed below, put into the trough with some liquid food:

Take of—Sublimed sulphur half an ounce,
Senna, in powder, one drachm; mix them well for use as above; or
Sulphate of soda one ounce and a half, dissolve it in strong
Infusion of senna two ounces,
Syrup of buck thorn two drachms; form them into a solution, to be given immediately in the same way.

Two ounces and a half of castor oil may, in some cases, answer better than either of the above forms.

When much fever prevails, the use of four or five grains of submuriate of mercury with an equal quantity of the antimonial powder may be found useful, being given in the manner already directed, by lessening and removing the febrile inflammatory state, and preserving the bowels in the proper open state. A strong solution of the calx or coarse substance known by the name of raddle, such as sheep are marked with, in the proportion of half a pound to a gallon of the pig's wash, has been considered not only a cure, but a preventive, of this disease. It acts by causing purging, and requires to be repeated according as the complaint may give way. The solution is readily taken by the pigs, when given before they are too much affected with the disease. On the lungs being examined after death, in these cases, they appear a hard lump, and are much swollen and enlarged, having a blackish colour, which shows that the complaint originates in a local inflammatory affection of those parts, attended, in some cases, with high fever.

This liquid wash should only be used until the inflammatory state disappears.

INFLAMMATION OF THE GLANDS OF AND ABOUT THE THROAT, OR QUINSY.

This is a disease which often affects swine in the store as well as partly fattened condition, but more frequently in the latter.

The parts swell and become much inflamed, causing a stiffness, hardness, and tightness, about the top of the throat, so that the pigs can hardly breathe; and there is frequently a considerable degree of soreness when they are touched.

In the cure of this disease, bleeding any where near the parts affected, as in the veins of the shoulder or under the tongue, where it can be done, should be first resorted to; and then the bowels should be opened, when necessary, by the above solution of sulphate of soda: setons may also be sometimes used with benefit near the swelled parts. The hogs at first should have little else but their wash; but afterwards a warm bed and warm cordial wash will mostly be the best remedies. If external suppuration appear likely to take place, the matter when properly formed must be discharged, and the part dressed with dry lint or other such matters; but tar and brandy, which are often advised, are hurtful and improper in most cases.

This complaint is not unfrequently termed *swelled kernels*, from the small glands of these parts having such knotty sorts of enlargements in them.

STAGGERS.

Swine are sometimes subject to a giddiness in the head like other cattle, for which timely bleeding and fresh air are the chief remedies. Nitre is recommended by some as very beneficial in such cases.

This may be given with about half an ounce of sublimed sulphur, and it will in general speedily take away such affections of the head in pigs. A seton put in behind the ears may likewise, in some cases, be of great advantage. When the disease is present, the hogs should have little more than wash for their support; but when it is removed they should be well fed, and kept rather open in their bodies.

MEASLES, OR RED ERUPTIONS ON THE SKIN.

Swine are very subject to this disorder, which renders their flesh unwholesome. No pork-butcher, of any respectability, will sell *measly* pork; and, therefore, this meat is seldom purchased at a common butcher's shop.

The pigs seemingly are not much diseased by this complaint, as it seldom appears until they are killed, when it shews itself by small purplish eruptions in the skin or the fleshy parts, which are sometimes of a rather watery nature. It has rarely any tendency to destroy the animals that are affected by it, but there is a hoarseness in the cries of the pigs.

The remedies for the measles are sulphur, antimony, and madder, with cordials, when necessary, made of treacle and strong beer in warm wash, and good peas and pollard. If the sulphur, *&c.*, be mixed with the wash, which is the best way, allowance must be made for the waste.

A strong solution of dried alum put into the wash when the disease is evident has been found, in some cases, to remove the complaint in a speedy manner.

INDIGESTION OR LOSS OF APPETITE.

This disease proceeds from over-eating, as well as debility and want of power in the stomach. Pigs should only be allowed to feed moderately, and never to overburden their stomachs. In these cases there is a want of desire for food in the animals, with a frequent inclination to throw up their meat, followed by a speedy decline in their condition and appearance, and they become lean, thin, and in a poor state.

In the cure of cases of indigestion, give two table spoonfuls of sulphur once or twice a day; or in cases of great heat, equal parts of supertartrate of potass and nitrate of potass. But in some cases the following medicine will be more useful:

Take of—Sublimed sulphur, three drachms,
Subcarbonate of potass, two drachms,
Cascarilla bark, in powder, one drachm and a half,
Powdered ginger, two drachms; mix them into a powder, to be given in thick wash as there may be occasion.

Common salt, with any stomachic substance, is likewise beneficial in these cases.

When a pig thus overloads its stomach, it generally lies on its belly and begins to purge and vomit. A retrenched diet and sulphur, in general, prove a sure remedy in all such affections of the stomach.

GARGET.

This is a disease attended with considerable huskiness, and a constricted state of the hide or skin, with many other appearances of the same kind.

The best effects have in these cases been found to be produced by the use of sublimed sulphur in the proportion of half a pound to a quarter of a pound of the root of madder in fine powder; which, when well mixed together, are to be put into a pail full of the hog's food, by which means the mixture is readily taken by the hog. A small quantity, as eight, ten, or more grains of antimonial powder might sometimes be added to the above with very good effect.

BOWEL COMPLAINTS.

Hogs are not very liable to be much affected in their bowels, either by looseness, gripings, or constipation; but they are occasionally inconvenienced in all these ways, and especially in the last. They should, therefore, be always well attended to in that state, as well as in both the others, and care should be taken that they are never too much in the loose state, as in neither case they at all thrive or go on well, in the rearing, store-keeping, or fattening practices. Hogs may be kept open by the use of sublimed sulphur, and in cases of scouring and gripes, such means should be used as have been directed for sheep under the same heads. Feeding them with proper dry food, when thus attacked, often answers the purpose perfectly without any thing else being done; but if it does not, a little finely powdered prepared chalk, mixed with milk, has commonly the desired effect. Where gripes prevail for any length of time, which will be shewn by the uneasiness and rolling about of the pig in the sty, they may be removed by giving good food, and a little of some composition of the opiate kind, such as the confection of opium, or the powder of hartshorn, with the same, as they mix well with the wash, and usually succeed in a very ready and complete manner.

MANGE OR SCAB.

This is a complaint that is sometimes very troublesome to swine, preventing them from thriving and getting on in their growth and condition. It often arises from a dirty state of the animals, by which they become infested with vermin in the skin, and become poor and quite out of order.

It appears in the form of blotchy sores in different parts of the body and other parts of the hogs, which are itchy, and cause so much uneasiness that the animals get no rest, but soon become thin and lean, and spread the distemper among the other swine in the same places.

The cure in these cases is probably best accomplished by the use of a mixture of the black sulphate of mercury, and sublimed sulphur internally, and by washing the sores well at first with soft soap and warm water, till the whole become quite clean, and then touching

them over the surface by an ointment of the following kind:

Take of—Tobacco, in fine powder, two drachms,
Sublimed sulphur, half an ounce,
Mild mercurial ointment, two drachms; mix them into an ointment for use as above.

SORES BEHIND THE EARS.

The parts behind the ears of some pigs crack and become sore in hot seasons. An inunction of a little saturnine ointment, with a few grains of sulphate of zinc, will in general cure and heal them by a few applications.

SORE SWELLINGS IN THE UDDERS.

The udders of sows are apt to take on hard glandular swellings, for which camphorated saturnine washes or ointments may be used with benefit, care being taken to have the parts clean wiped before they are permitted to suckle. In such cases half a drachm of calomel may likewise be usefully given every second or third night for two or three times, by which means a favourable change will be induced, and the swellings be speedily removed.

Where the pigs are not suckling, such swelled glandular parts may be more expeditiously removed by being rubbed with a little weak mercurial ointment; but it might be dangerous without much care was taken to such as suckle.

BITES AND STINGS OF REPTILES, &c.

These accidents occasionally happen to swine in different ways; and when neglected, they often cause much inflammation and swelling in the parts, by which the hogs become very uneasy and lose their desire for food, getting fast out of their thriving condition.

As soon as the bite or sting is discovered, the part should be well washed with vinegar or strong hartshorn spirit; or when these are not at hand, with a strong solution of common salt in water. This may be repeated several times when necessary.

VERMIN.

Hogs when in the poor lean state are often infested with vermin of different kinds, especially a large and a small sort of lice, which arises from too sparing keep, and other causes, which induce weakness in the animals; for by being better fed, and admitted to a more open and free air when turned out into some proper place, they are relieved from these vermin.

Where the cases are bad, they may be well washed over with soft soap and warm water, and then be put to swim in some proper clean stream of water, which will often have a good effect in destroying such vermin; but in some states other means must be resorted to, such as the application of an ointment of the kind directed below to such parts of the hog where the vermin are seen:

Take of—Mild mercurial ointment, two drachms,
Hellebore root, in powder, one drachm and a half,
Hog's lard, two ounces,
Solution of subacetate of lead, twenty drops; mix and make them into a soft ointment, to be used occasionally as above mentioned.

ACCIDENTS FROM POISONS, AND OTHER SUCH CAUSES.

As pigs generally devour every thing they meet with, they very often swallow pernicious food. Slips of yew and hemlock are poisonous to swine, of which several instances have been recorded; but henbane has been asserted to be beneficial and nutritive to them. These animals are not so liable to bruises and wounds from falls as neat cattle; but they often incur wounds among themselves. It is sometimes dangerous to put pigs or hogs among others which are strangers to them; for should they conceive an antipathy to a particular one, which is a very common case, they will not only prevent it from feeding, but fall upon and wound

it; and, when once they have drawn its blood, will very probably kill it. Such a hog, if saved, should afterwards be fed by itself if possible. It is also dangerous to let swine have access to infants, or any young animals, as mischief may be the consequence.

SECTION XIII.—*Different Uses to which the several Parts of Hogs or Swine are appropriated and applied.*

THE hog, from the excellence of its flesh, its prolific nature, and its quick-feeding properties, may be considered as one of the most profitable and advantageous of our small sorts of domestic animals; and might probably be reared and fattened in many situations in which it is yet but little regarded, by the farmer or cottager of any description.

In the management of hogs, much loss seems to have arisen from the supposition, that they can only be kept with profit in so far as they may consume the materials that would otherwise be wasted and lost on the farm. There cannot, however, be any doubt, but that swine will pay for their keep as well as any other sort of live stock whatever, where a judicious system of cultivating crops, as above mentioned, purposely for them, is pursued or proper food, purchased and prepared for them. This has, indeed, been fully shown by various trials and statements, that have been made on the subject by different writers and practical farmers of much knowledge and experience.

FLESH.

This, with the blood, which forms an excellent sort of food, when properly prepared, is the most useful part of the animal, and exceedingly delicious and nourishing, when eaten as,

PORK.

In warm weather, pork is by no means wholesome, on account of its quick tendency to a state of putridity. On account of their hot climate, the Israelites were prohibited from eating it by the Mosaic law; for which reason the Jews will not touch it, even in a *cold* one. Pork, in the summer-time, is sometimes productive of loosenesses, fluxes, and other such disorders. There is a great difference in the flesh of this animal, according to the manner in which it is kept and fed. The English is supposed, by some, far preferable to the Irish pork, and, indeed, many Irish people have consequently imbibed an antipathy against it. In England, however, it is considered a great winter treat when well fed in this intention in either part of the country.

The most useful mode of curing this sort of meat is however probably that of salting it down for

PICKLED PORK,

and which is far more profitable than bacon. In this method, after the hog is cleansed of the hair, and the head taken off, together with the legs, hands, neck, loins, and much of the lean and all the bones are cut out, which will amount to nearly two-thirds of the whole hog, the remaining part, which is the fat or prime pork, is to be cut into pieces of the size proportioned to the circumference of the salting-tub; and every piece rubbed on each side and on every part with common salt, having some beaten saltpetre sprinkled on each. The bottom of the tub should also be covered with salt, and when the pork is sufficiently powdered, the pieces laid in, with the rind upward, and every one pressed down with all the strength that can be used, and wedged in so close as to leave no apparent chasms. Over the whole is to be spread a covering of salt, with a very slight sprinkling of saltpetre, as too much makes it hard. In about a month or five weeks the brine will begin to rise, and in a short time afterwards cover the whole surface of the tub;

but if from a defect in the salt, it should fail to dissolve into brine within that period, it will be necessary to make a quantity of brine and pour it over the pork; for unless the whole be covered with brine, it will not keep well. In adding the brine, care should be taken not to disturb the pieces of pork, as that will prevent them from taking the brine and being equally salted.

It is a very good mode of pickling pork, after the different bones, and the bloody veiny parts have been taken away, to have a tub of proper depth provided for the purpose, which as soon as the parts have been well rubbed over with strong common salt, and a little saltpetre, to cover the bottom part thinly with a layer of such salt, and then put in the pieces of pork in a close manner, filling up all the open parts that may be formed with the same salt, so as to be quite firm; after which, putting another set of the pieces with the salt in the same way, continuing them until they nearly reach the top of the tub, when a good stratum of common salt must be laid over the whole, and the lid put on so as to force the whole well down in a very tight manner, in order that no air may enter, as on this a great deal depends in the keeping and producing good pork. A cool situation is the most favourable for the standing of such tubs; and where any of the pieces of meat are taken away, the rest should constantly be pressed well down, and have more salt put over them. Fresh salt need not be used in the process every time, but the same salt, when made dry, may be often applied for the same purpose. The most material point in this practice is, the prevention of the access and action of the oxygen of the atmospheric air, which causes it to become bad and unpleasant in the taste.

PREPARATION OF BACON IN CURING IT.

This is the flesh of the hog after it has been salted, and dried in the smoke of the chimney, or without being smoked. In the former case, it is termed smoked bacon, and that method of preparing it is peculiar to certain districts. Such hogs as have been kept till they are full-grown, and of a large size, are, for the most part, converted to the purpose of bacon. The following is the method of making bacon in Hampshire and Somersetshire:—The season for killing hogs is between October and March. When large hogs are killed, they first lay the sides in the salting-troughs, and sprinkle them pretty heavily with bay-salt; then leave them twenty-four hours, in order that the blood and some of the over-abounding juices may drain away. After this, they take them out, wipe them very dry, and throw away the draining. They then take some fresh bay-salt, and beating it well in a large iron frying pan, rub the meat very well with it, repeating the rubbing every day for four days, turning the sides every other day.

If the hog be very large, they keep the sides in brine, turning them occasionally for three weeks; after which they take them out, and let them be thoroughly well dried in the usual manner; for if they are not fully dried, they neither salt or keep so well, nor eat so fine.

The method of curing bacon in and about Hamburgh and Westphalia, is after this manner:—Families that kill one, two, or three hogs a year, have a closet in the garret adjoining their chimney, made very tight and close to contain smoke, in which they hang their bacon to dry, out of the reach of the heat of the fire, that it may be gradually dried by the smoke only, and not by heat. The smoke is conveyed into the closet by a hole in the chimney near the floor, and a place made for an iron stopper to be thrust into the funnel of the chimney, about one foot above the hole, to stop the smoke from ascending up the chimney, and force it

through the hole into the closet. The smoke is carried off again by another hole in the funnel of the chimney, above the said stopper, almost at the ceiling, where it vents itself. The upper hole must not be too big, because the closet must be always full of smoke, and that from wood fires; for coal, or turf, or peat-smoke, will not do so well in such intentions.

The manner of salting is the same as meat is usually salted in common; sometimes they use our Newcastle salt, or St. Abbs, or Lisbon salt. In those parts they do not salt their bacon or beef so much as is done in England, because the smoke helps to cure it, as well as the salt in these cases.

The modes of curing the meat of hogs for bacon differs in some measure in the practice of different countries, districts, and persons; so that there is some uncertainty in the business: but, in all cases, the hogs should not have any kind of dry meat for two or three days before they are to be killed, though they need not be restrained from water as drink. After they are killed, the hair is to be removed in a suitable manner by as little heat in the water that is made use of as possible, as too great heat is very injurious to the meat; and by burning it off, the practice in some places, there is danger of singing and injuring the skin; moderately hot water is probably the best. It probably answers the intention in the best manner, when, after the scalding, the hair and scurfy matters are wholly removed, to put the carcasses of the hogs into a proper vessel of clean cold water, rubbing and washing them well in all their parts, when the inside matters should be taken out, and every inner part of the flesh of the hogs washed quite clean in the same manner, which may cool and otherwise be of much benefit to the meat. When dressed, the hogs should be placed upon an inclining plank of wood, in order that the carcasses may be properly drained, and not suffer by the retention of moisture in any part, being then hung up with a linen cloth about them in some cool proper place for a day or two; after which they may be cut up into the necessary forms, as flitches, hams, and other cuttings, letting the parts remain upon a bench in that state for a day longer in an airy place where there is the least possible moisture or wetness; and, if any of the parts are bloody, they should be taken away by the use of the knife. When all this has been done, a proper quantity of salt-petre and common salt, in the proportion of about one part of the former, to a dozen or more of the latter well dried, is first to be rubbed well, on the sward side, until it become a little dampish, and then on the other or inner side in an equally perfect manner by means of the hand. A small portion of the salt-petre for the hind parts and the bones must be reserved, and applied in an equally perfect method, by rubbing it well on and under the several parts; the ordinary salt must then be applied in the same way, care being taken to have every part, particularly the hollow and more thick portions, well done over. The whole should then be put into the tub, or some other vessel that is perfectly tight, so as not to lose the brine, and salt should be strewed well over each separate flitch, as put in with a little salt-petre to the bony parts, the topmost flitch having a rather thick covering of the salt laid over it. The main point in this business being the rubbing the saline matters well into the flesh, and other parts, so as to have them all well and properly cured. When the several parts have been in the tub for about a fortnight they should be taken out, the brine boiled, and skimmed until no scum arises, and then put aside till it becomes cold. The tub

should in the mean time be well scrubbed, and cleaned in every part, and when it is quite dry the flitches are to be repacked in it, beginning with the uppermost, and changing the surfaces, all being fresh wiped and rubbed with a hard cloth. Salt-petre and common salt, mixed in the proportion of two ounces to three or four, must then be well rubbed over the fleshy surfaces of them, putting plenty of common salt over the topmost layer. After remaining in this state for a week, the flitches may be taken out of the tub, and put upon a plank or bench to drain, and then hung up to dry in some proper situation, which is perfectly dry and airy without being too near the fire, as the heat is injurious by causing it to become resty. Drying bacon by artificial heat is by no means a proper method when it can be avoided. When properly dried, it should be kept in some place in such a manner as to prevent the action of the air upon it as much as possible, and to preserve it from restiness and the ravages of the salt-worm. Large strong paper bags are very beneficial for hanging up bacon flitches in from the time they are taken out of the tubs. Hogs that have the weight of eighteen or twenty stones or upwards mostly require about one stone of common salt with from half a pound to a pound of salt-petre, as they may take such saline matters well or ill.

If smoked bacon be required, a house or room, as above described, becomes necessary; and it is a good method of curing it, having, in some measure, the effect of preserving it from insects and other vermin.

The more close the texture or grain of bacon is, the more perfectly and free from restiness it keeps, not admitting the air so easily; therefore such breeds of hogs as excel in this particular will be the best for the purpose of bacon. All the more strong bony portions of bacon hogs should be taken away, being unfit for such use, as well as all the fat about the kidneys, which causes their curing in the best and quickest manner. All such meat of hogs as is designed for bacon, should be of a good brightish colour of the flesh kind in the lean, with a slight cast of it in the fat, being the firmest and the least disposed to become resty.

In these methods bacon of the best qualities and in the most perfect state may be prepared and provided in all cases.

It has been well observed, that it is not improbable that the reputation of Westphalia for the excellence of its cured pork and hams is derived from an high antiquity. The superior delicacy and luxurious flavour of young milk fed pork is everywhere acknowledged, although such a commodity is not to be obtained in every part of the country. Pork of all other flesh meat is best adapted to curing and preservation with salt in different ways, and has the further merit of never or very rarely cloying the appetite; for it appears that men will subsist longer upon that diet without desire of change than upon any other flesh; in various parts of Westphalia, the labourers, and even the farmers themselves, very rarely taste, or desire to taste, any other. It is doubtless from its solidity the most economical and the most nutritious food. As to the labourers and farmers of this country, many of the former as well as the latter sit down cheerfully and constantly to a lump of bread and of bacon, the latter of which they frequently eat without its being boiled, toasted, or fried, as it is deemed sufficiently cooked by being cured. It is not to be forgotten that the superior excellence of swine's flesh is materially to be attributed to the superior food which they require, and that pork or bacon will always be solid and good in exact proportion to the solidity and

goodness of the articles on which the animals have been fed; for although grass, hay, roots, or oil cake will fatten a sheep or an ox, perhaps to the maximum or greatest point of goodness, nothing hitherto discovered will do the same with swine, but milk, corn, pulse, or such like matters. When fattened with all other sorts of materials, the flesh is loose, flabby, and of a very inferior flavour and quality.

There are different modes in different districts of preparing the flesh of swine for bacon, according to the habits and customs of them.

PRACTICE OF SWALING.

In the county of Kent, when bacon is to be made, it is the practice to singe off the hairs or coat by making a straw fire round the hog, an operation which is termed swaling.

The skin in this process should be kept perfectly free from dirt of all sorts. When the flitches are cut out, they should be rubbed effectually with a mixture of common salt and salt-petre, and afterwards laid in a trough, where they are to continue three weeks or a month, according to their size, keeping them frequently turned; and then, being taken out of the trough, they are to be dried by a slack fire, after which, they are to be hanged up or thrown upon a rack, there to remain till wanted.

This is a less perfect method of dressing, preparing, and forming the flesh of hogs for the purpose of bacon than those which have been described above, being less certain and regular, besides the danger of injury being done to the external rind parts by the action of the fire. The bacon is, however, considered by some as better flavoured and more firm in its quality.

SALTING AND DRYING HAMS.

A ham is the hind leg and thigh of the hog, which is prepared by being salted, smoked and dried. The method of performing this in the districts most celebrated for good hams is sometimes to rub them very hard at first with bay or other salt, but mostly the former; after which, it is the practice of some to let them remain on a stone bench in order that the brine may discharge itself, while others cover them up close. In the course of a few days they are again rubbed as hard as before, with the same sort of salt mixed with rather more than an ounce of salt-petre to each ham. When they have continued about a week longer on the bench, or in the salting tub, among the brine, they are mostly hung up to dry on the sides of large open chimneys, some exposing them to the smoke of peats, coals, or other more light sorts of fuel, while others carefully avoid having them smoked. If not wanted sooner for use or sale, they are continued in these situations till the approach of warm weather, when they are packed up in casks with straw or the seeds afforded in making oatmeal, and thus sent to the places of sale. According to a statement in the Survey of the county of Westmoreland, it has been found by experiment that hams lose twenty per cent. of their weight in the curing. This is a fact which the farmer, who fattens many pigs, should consider well before he enters on this system of management.

In the curing of hams and tongues it has been considered an improved practice, after having rubbed them over with salt-petre in the quantities of about two and a half ounces for each ham, and half an ounce for each tongue, to mix bay salt, common salt, and sugar together in the proportions of about four or five ounces of the first and last to six or seven of ordinary salt, for those of sixteen pounds weight, and rub them well into the hams, or a small portion of them upon the tongues, so as to cure them effectually and give them the best

flavour. Others again make use of these saline matters in the state of a solution made by boiling them with alegar and stale old ale in the quantities of about a pint of each, the solution being poured upon the articles in a boiling state, and then washing and rubbing them well with the liquor, and turning them daily for a fortnight or more, when they are to be hung up to dry, being previously washed and rubbed over with the meal of some sort of grain, as barley or oats, by which they are said to gain a particularly fine taste. The frothy scum in all such cases should be fully removed whenever it rises, before the pickle is applied to the hams or tongues, as well as afterwards. Neat cattle tongues may also be well cured in either of these ways in the most perfect condition.

The brine which is left in the tubs or vessels after curing bacon may, by being well boiled and skimmed, be used with much economy and benefit in the curing of such tongues. It may also be preserved by bottling for use in boiling different kinds of vegetables, as well as for preparing seed for sowing, by which means much advantage may be gained by breeders and keepers of hogs.

Every part of this animal serves as food, even the

RIND OR SKIN.

And Count Burghous, Director of the Economico political Society of Helvetia, has not long since discovered that hog's skin makes excellent leather for saddles, harness, traces, and such like articles, and which is much stronger than horse or cow leather; and that, contrary to a former opinion, the flesh will take salt well without the skin, and that the salt and smoke penetrate more readily, and the bacon acquires a finer flavour. Most people, however, would rather dispense with the *leather* than the favourite *crackle;* and it is very doubtful whether bacon will keep well without the defence of the rind or skin.

HOG'S LARD.

Even the fat of this animal is of great utility for ointments, pomatum, cooking, and other such uses, It is far better than butter for frying soles, pancakes, and some other articles. The lard is chiefly obtained from the flank of the animal, and is freed from the membranes and vessels by being taken out and cut in small pieces; it is then well washed in water till the water comes off colourless, and afterwards it is melted over a very gentle heat in a shallow vessel, and kept on the fire till the water is wholly evaporated. While still liquid, it is poured into bladders, in which it concretes, and in this state it is brought to market.

Lard is inodorous, tasteless, and perfectly white; soft and nearly semifluid. Exposed to a heat of 97°, it melts and concretes again when cooled. It is insoluble in water, alcohol and ether; but is dissolved by the strong acids being at the same time decomposed; and, like the fixed oils, it combines with the alkalies and forms soap. It is oxidized, when melted, by having a little nitric acid stirred into it, and assumes a greater degree of firmness, with a yellow colour. By destructive distillation it affords results very similar to those obtained from the analysis of fixed oil, and appears to be a compound of oxygen, hydrogen, and carbon, in unknown proportions. When lard is long exposed to warm air, it becomes yellow, emits a fetid odour, and, owing to oxygen being attracted from the atmosphere, the sebaic acid is formed. The state of rancidity may, in some degree, be removed by washing it with very pure soft water, which, during the operation, becomes acid and reddens litmus paper. Water, which has been taken clear from off carbon or charcoal, would in all probability render it quite sweet

by being washed with it. Lard, prepared by the dealers and preserved with salt, is melted with twice its weight of boiling water, well stirring the mixture; it is then allowed to cool, when the lard may be separated. These processes are intended for purifying lard; but in order to obtain it very pure, it should be cut into small pieces and washed with water till the water come off quite colourless, before it be melted. During the melting the remaining water is evaporated; and that this is the case may be ascertained by throwing a little of the melted fat into the fire, when it will crackle if any water remain. The heat must not be raised above 97°, the melting point of fat; because otherwise the fat is decomposed, rendered acrid, and assumes a yellow colour. To keep lard clean and preserve it from the action of the air, it is, as already observed, run into bladders in its liquid state.

HAIR OR BRISTLES OF HOGS.

The stiff glossy sort of hair, scraped from the hogs when killed, is used for various purposes. When large swine are kept in great numbers, the bristles may be turned to advantage, by disposing of them to brush-makers; and shoemakers use them for their waxed ends. Where this bristly hair can be procured in sufficient quantity, it is made use of as manure. In London it is occasionally bought at about nine shillings the quarter, a ten-bushel sack stuffed quite full, and is applied by being turned in just before the crops are sown, and succeeds well on the lighter sorts of land, but its effects are only of short duration.

DUNG.

This, as the animals mostly live on somewhat rich food, and have not ruminant stomachs, may be rendered admirable manure, when it is properly raised, and produced by the hogs in their sties, yards, and other places. It is found to be a very powerful sort of manure, and is supposed by some to be nearly equal to that of the stable kind. Others, however, imagine, that weeds are more apt to rise after the use of this sort of manure than that of other sorts. It is also asserted, that one load of swine's dung is nearly equal to two of most other sorts, and that it is the richest of almost all animal manures. This, however, is a mistake, as from trials made, it has been shewn, that *night-soil* is certainly to be ranked considerably before it. It is not so good or valuable as that of the horse for many purposes where heat is required, as it takes on less and is not so lasting; but it is, notwithstanding, a rich and useful manure in many cases, as being produced, like that of the horse, by an animal that has not a ruminant stomach, the advantages of which have been already sufficiently explained.

Much preference is, however, very generally given to the dung of swine, one load of which, it is said by some, will go as far as two loads of many other sorts of dung. The laying it on too thick may perhaps have occasioned the old mistaken notion of its breeding more weeds than any other kind; for all dungs will make weeds shoot up. Whether this be occasioned by the dung containing within itself seeds of those plants not so thoroughly digested by the animals as to be deprived of their vegetative power, or by the additional fertility which they communicate to the earth, is uncertain. This dung, according to some accounts, is most effective, when carried from the sty directly to the field, where it is a rich manure both for corn and grass, but especially for the latter, and for almost any sort of land. Hot sands and gravels are particularly benefited by it, and it is reckoned a very great fertilizer of fruit trees. Many good farmers prefer this dung to

most ordinary sorts of manure, and take great pains to increase it. With this view, they have their hog-yards well paled, and paved with pebble or other stones, or laid with chalk, which is much the best; and are very careful in throwing into the sty all the straw, waste fruit, roots, plants, weeds, bean-stems, and all other such matters, which are the refuse of the garden, together with the offals of the kitchen, and every kind of other trashy waste matters; all which are not only very good for the hogs themselves, but increase the dung to such a degree, that ten or twelve swine have been known to yield sixty or eighty loads of excellent manure in the year. Some farmers will make their hog-yards produce them an annual profit of twenty or thirty pounds. This has long been considered the best kind of dung to prevent or cure the canker in trees; and it has been supposed the best manure when mixed with horse-dung; for which reason it is advisable to place the hog-sty as near to the horse-dung hill as it conveniently can. The farmers in some places frequently sow on poor, light, shallow lands, a small white pea, which they never reap, but turn in upon them as many hogs as they think the crops will fatten, and let them lie upon them day and night. The dung and urine of these animals enrich the land so much, that it soon acquires a thick sward, and continues to be good grazing ground for several years afterwards; such a practice, however, is not to be adopted, except in particular cases and circumstances, as much waste and loss must be the consequence of such a very slovenly mode of management.

Chapter IX.—LIVE STOCK.

RABBITS.

Section I.—*Nature, Character, Habits, Longevity, Fecundity, Descent, Uses, and Kinds.*

The rabbit has much similarity to the hare in its form and appearance, but there is an insuperable bar of distinction placed between them by nature, in not permitting them to copulate or intermix with each other, as they have constantly the greatest possible repugnance and aversion to it. In their habits, propensities, and modes of living, they likewise differ very materially, as the former burrows and forms holes in the light earth, where it retires to, lodges, and brings forth its young; but there is nothing of this sort in the economy or practices of the latter.

The uncommon fecundity of the rabbit has long been remarkable, as it is not unusual for it, in particular circumstances, to breed six or seven times in the course of the year, producing, in general, seven or eight young at each time: whence it has been absurdly calculated, that a single pair may be capable of increasing, in the space of three or four years, to the vast extent of one million, and considerably upwards; so that, if they were not frequently reduced in a variety of ways, there would be grounds for apprehending that they would, in no great length of time, much surpass the means of their being kept, and overrun the whole surface of the country. But in ordinary cases, the rabbit does not breed nearly so frequently in that length of time; besides, their very great increase is checked, in no small

degree, not only by the taking of them for the use of human food, but by the variety of reptiles and other animals that so continually prey upon them. In some warm countries they have, however, increased so fast and largely, that they have become extremely troublesome; and it has been found necessary to destroy them in a great degree.

The rabbit lives to the age of from eight to nine years, and is the most prolific in a rather warm sunny situation and exposure, where the climate is temperate. It is an animal that is now common in most of the more mild and temperate parts of Europe; but in very cold regions it is only capable of being successfully raised in houses for the purpose. It abounds greatly in many parts of this country, where the skin of it forms a substance of very considerable value, utility and benefit, in the manufacturing of felts and other such articles. It is abundant here to the most extent, probably, in the counties of Lincoln, Norfolk, and Cambridge, but is found in great plenty in many other districts. Rabbits were at first probably natives of warm climates, as Greece and Spain appear to have been the only places in Europe where they anciently existed, and from whence they were transported into the more temperate regions of it, where they are at present naturalized.

Naturalists have characterized this kind of animals as having two fore teeth in each jaw; and in the upper one a second inner row of fore-teeth, which are considerably smaller than the outer or *primaries;* that the fore-feet have each five, and the hind-feet four toes; that the animals are very timid; live on vegetable food, and use the hind feet, in their progression, as far as the heel, running by a sort of leap or repeated bound. They have very short tails, termed *scuts.*

APPELLATIVES, OR USUAL NAMES.

The grown male rabbit is termed a *buck;* the female, when full-grown, a *doe;* the young, male or female, *young* rabbits.

ORIGIN.

The common rabbit, in the wild state, is probably that from which all the other sorts and varieties of the wild and tame kinds have originally proceeded, as will be evident from what is said below.

FOREIGN BREEDS, SORTS, OR VARIETIES.

These are not many, but there are some different sorts still remaining distinct, which are somewhat curious or useful in their qualities; as the

ANGORA RABBIT,

which is a native of that country, and is covered with long hair or wool, which is of the most silky fineness in its quality, and which falls down in a sort of wavy curls on its sides. It might probably be introduced here with success, as has been already suggested; as there is every reason to suppose that it would thrive and answer well in different situations and places, and its beautiful white coat be of very great benefit and value, for the purpose of different manufacturing uses. And the

HOODED RABBIT,

which is a very remarkable kind, and described by naturalists as having a sort of doubling of the skin on and over the back parts, into which the head is capable of being withdrawn; and there is likewise a part which lets down underneath its throat, into which the fore legs are drawn and prevented from being seen: there being small openings in the former loose skinny part for the purpose of transmitting the rays of light to the eyes. The body part is ash-coloured,

but that of the head and ears is in general of a brownish cast. It prevails much in some of the West-Indian islands; and has, most probably, been originally the produce of a stock of this sort, transported thither from some other part of Europe. It is considered, by some, to be a variety of the above kind, and by others termed the *Russian* rabbit, but which is absurd, as it is wholly unknown in that extensive empire.

BREEDS, SORTS, AND VARIETIES, OF THIS COUNTRY.

These are several in number, both of the *wild* and *tame* kinds, and which differ considerably in their qualities, uses and value. In the

WILD KIND,

which, in some places, are very numerous, and useful for food, as well as their skins, which serve different purposes of the manufacturer, the principal breed or sort is the

COMMON RABBIT,

which is described by naturalists as having a very short tail, nearly of the same colour with that of the body; the ears black at the points or tips; and the hind legs shorter than the body. Of this sort the wild rabbit, which has a brownish grey or ash colour, is a variety, and has the upper part of the tail black, and the under part of it white, and there are also the several tamed varieties of it as below. This common sort of rabbit, is naturally the inhabitant of the more warm parts of the East, Africa, and Europe, and not a native of this country, but has now subsisted in it, in both the wild and tame state, for many ages. It here chiefly inhabits and confines itself to the dry, sandy, and more light sorts of land, in which it makes long winding holes or burrows, where it remains in the middle part of the day, wandering out in the evening, at night, and in the morning, in search of food, which is principally of the green vegetable and grain kinds. It has a fine white flesh which is held in high estimation as food. Of this sort the common grey rabbit is the variety or kind which is the most generally esteemed and the most used as stock almost everywhere; the wild black has usually the next preference; after it, the wild silver-haired; and lastly, the sandy coloured, which is considered the worst of all, as the skins of them, in consequence of the inferiority of the fur, are, in some districts, deemed only half-skins even in the best or most favourable seasons. The skins of the silver-haired sort, which were once in great esteem, being now of but little value, the breed is much discontinued, as they are less hardy in their nature, less prolific, and in common much leaner, than those of the grey kind. In the

TAME OR DOMESTICATED KIND,

which are somewhat larger, and more full and plump in the body parts, there are many different sorts or varieties, with several different shades or casts of colour, as the

BLACK DOMESTIC RABBIT,

which is of a regular and uniform fine black colour, and good size of body, with a rather hardy nature and good properties. The

WHITE DOMESTIC RABBIT,

in which the colour is regular and uniformly white, with fiery red eyes. It is a delicate but full-bodied kind, which has a somewhat less hardiness of constitution than the preceding kind. The

PIED DOMESTIC RABBIT,

in which the colour is speckled or mottled black and white. It is of a mixed but somewhat hardy nature. The

SILVERY-HAIRED DOMESTIC RABBIT,

which is of a silvery grey or ash colour, with tawny-coloured feet. Its hardiness of constitution is much less than in the common sort of rabbit, and it is probably less productive, but its skin may be more valuable for some purposes.

Some other varieties have been noticed as a large, lengthy, deep-bodied, hare-coloured sort, with much length of ears and very large full eyes, which breed well, and afford much meat of an excellent quality; and a sort to which the term *smut* has been applied in some places, from their having a black spot on one or both sides of the nose, whence they are denominated single or double smuts, and are esteemed somewhat in proportion, as these sorts of spots are more or less numerous on the head and body parts, and for the size, length, and fineness of the ears, and the manner of their falling down over the head.

In the tame sorts of rabbits the flesh is generally less sweet and pleasant to the taste than that of the wild kind, being softer and more loose in the texture, with more flabbiness, insipidity, and rankness, as it commonly feeds so as to become very fat, if not properly prevented in due time, and by suitable management. But much, in this respect, constantly depends on the nature and quality of the food which is employed in feeding rabbits in the tamed state.

SECTION II.—*Lands proper for and most beneficially applied to Warren Enclosures, in raising and keeping the wild sorts of Rabbits, and the Manner of forming and stocking them.*

IN general, the sort of land which is the most suitable and proper in this intention is that which is of the poor and more short, close, grass kind; as rabbits increase faster and thrive much better on such when light and quite free from damp and wetness, than on such as are more rich in their nature and qualities; as when they are of a heavy, moist, or marshy kind, they are wholly unfit for the raising of these animals. On lands of these kinds, where they are liable to the sudden flushes of rich grass, much injury and destruction is apt to arise in rabbits from bowel complaints. The sorts of soil, which are the best and most suited to the purpose, are all those which are of the somewhat sandy, gravelly, light chalky, rubbly, or limestone rocky qualities, in which the animals can readily and easily form their retreats and fix their colonies; and which, from having a proper degree of dryness and warmth, are pleasant and suitable for raising their young. They are wholly incapable of burrowing in the clayey and more cold sorts of land; and besides which they are liable to have their young starved and destroyed in the early state of their production. But grounds, where layers of the turf-moss kind much abound, and which are sufficiently dry, serve them well for making their burrows in, and for preparing the beds for the reception of their young. It is very commonly the case, that rabbits which are raised on light sandy level lands are less valuable in skin as well as carcass than those which are reared on high grounds of the loose chalky kinds. This has been strikingly exemplified in a warren or enclosure of this kind, where a part in the lower portion of it was a light blowing sand, the other parts of which extended to the top of a very high chalk-hill that faced the north in a direct manner. The furrier, or person who purchased the skins, in this case decidedly declared that those which were produced on the high chalky hill were nearly of twice the value of the others which were raised on the sand, and that each of them were capable of being easily distinguished among the different parcels of skins.

There are some other sorts of poor barren land, which are of little value for any other purposes, that are well suited for this kind of stock, and which form the warrens of particular districts. These are such as are composed of a rather deep blackish, light, unfriendly earth, with a flinty surface, and a chalky or marly stratum underneath, on which few or no crops but such as are useful for this kind of animal can be raised to advantage. The yellow-ochrey kinds also, which are equally unfriendly in the production of valuable crops, but proper for affording those which are suitable for providing food for the rabbit: and some others which are less steril in their nature, but afford suitable warmth and protection in the cover, which they supply for the beneficial raising of the rabbit.

Rabbits are found to thrive and succeed best where the lands are constituted somewhat regularly of hill and dale, with an open exposure to the sun in the morning or early part of the day. These animals, notwithstanding they are more hardy in their nature, and capable of bearing more severities of exposure and weather, when fully grown, than many others, as well as of living and fattening where most other sorts of live stock would be destroyed, the smallest degree of wetness or cold is highly injurious to, if not wholly destructive of, their young; consequently, where the warren ground is raised and formed in the hill and valley manner, they naturally and necessarily establish themselves in colonies on the most sunny declining sides of the hills, and mostly when the ground is not too moist and damp, rather low towards the valleys, as affording more protection and greater convenience of food. It is probable, too, that the quality of the flesh, as well as the skin, may in some measure be affected by the nature of the soil, and the situation in regard to height or lowness, as from sandy grounds and very high situations it has been found particularly dry and hard; therefore, moderately hilly elevations and sunny exposures seem to have many advantages in raising these animals, as they can rarely be successfully produced on wholly level grounds, while the hilly kinds are in every way well suited to their habits and economy. The rabbit in its nature is much disposed to feed, and become fleshy and fat. It often becomes quite plump and fat from the lean state in a remarkably short time when the weather is dry, though it may be cold or even frosty; but not so readily when wet or damp, however mild it may be.

It is, consequently, evident that the practice of forming warren enclosures for rabbits can only be had recourse to with propriety and profit to the proprietor, the farmer, and the nation, where the land is of the nature to be wholly incapable of affording sufficiently beneficial crops of the grain, or some sort of grass kind for other purposes; as the trouble, circumstances, and uncertainty of it, render it more to the advantage of the occupier to depend upon such crops than on these animals. But on steril poor sorts of waste or other land, which are not worth more than a few shillings an acre, as from three or four to five or six of the present value for other uses, these sorts of animals may, in most cases, afford considerable more money-profit than any other manner of employing and managing them to which they can be put; so that on many portions of such poor unproductive, weak, sandy, dry, heathy, hilly, and other tracts of land in different districts, where the cultivation of grain cannot be practised, and where the nature of the soil is such as to produce little or no natural grass for the keeping of sheep, as well as where the situation is high

and bleak, or of a very rocky coarse nature, the system of rabbit-warren management may often be introduced, and carried on with much more profit and advantage than any other by the occupiers. Thus, though the rabbit is unquestionably a sort of live-stock, which is wholly improper for being bred, or cultivated on enclosed valuable land for other uses, yet it is not unworthy of considerable attention in such cases of land as the above, and such other rocky steeps as can at the same time be planted with suitable trees, as when they are well fenced in and stocked in this manner, they seem to be in a system of the highest possible improvement they are capable of admitting.

It is, however, strongly in proof that rabbits, in many cases of land, are comparatively very unprofitable, that in a great number of districts a large proportion of the warrens that existed nearly half a century ago, have been broken up for the production of grain, green and grass crops, and that very few have since been again returned to the warren state. The trouble and mischief the rabbits cause to the adjoining lands, fences, and crops, and the poaching which they occasion, as well as the naked dreary appearance which the nature of the enclosing fences produce, and the very minute attention which they require at all seasons, may be partly the cause of rendering them less pleasant and comfortable in the occupation than other sorts of farms.

It is a matter of very material importance in the appropriation of lands to the purpose of rabbit-warrens, to look well to there being some large populous town or city at no great distance, to which the killed rabbits can be sent at an easy expense, and be readily disposed of, as the warrens in several districts would pay little, if it were not for the good markets they have near them.

MANNER OF FORMING RABBIT-WARREN ENCLOSURES.

The nature of the enclosing fences in these cases is usually that of a sod wall, capped with furze bushy black thorn, or some other such material; but neither stiff straw or reed answer the purpose well, though they have been lately tried, as they become loose and perish too quickly. Streams, though ever so deep, must be fenced against, as the rabbits otherwise readily swim them. The necessity of good fences is therefore constantly to be well regarded in forming these enclosures. Where the warrens are large, the manner of proceeding in forming the fences of them is this: the sod, or sod and stone in conjunction, with which they are composed, where the latter can be had, are raised and formed in this manner. The former is cut and dug out square from about fourteen to sixteen inches in length, and from ten to twelve in breadth, as thick as the soil will allow; they are then placed with the sward side downwards, one upon the other so as to cross the joints somewhat in the same way bricks are laid in building. These sod banks are formed two sods, and sometimes more, in thickness or breadth, longer ones being occasionally put across both, in the manner trough-stones are placed in building walls. In this way they are raised to the height of about five feet, when the last or top sods are placed so as to project a little outwards over the bank, upon which is put the coping, kidding, or bearding of furze, black thorn, or other such materials, so as to extend over the face of the bank towards the warren about ten or twelve inches, being laid sufficiently substantial to keep together in a close manner; a large sod capping is then placed all along upon it to prevent the wind from blowing it off, as well as preserve the wall from the effects of the wea-

ther and hinder the rabbits from getting over it. Sod walls or banks formed in this manner usually cost about two shillings the rood; the furze fagots, one of which will cover three feet, about fourteen shillings the hundred; putting them on and capping, three pence for the same extent. It is considered that these bank rabbit walls will last in general from five or six to more than twelve years, and they have been found to stand sixteen or twenty, by facing them once in the course of every seven years at about one half the first cost: but in common they will last without much repairs seven years or more. The capping on such earth walls should seldom or ever be put upon them until they are perfectly settled, as they are very liable to shoot down in different parts when newly formed.

STOCKING RABBIT-WARREN ENCLOSURES.

The methods of stocking these with the rabbits vary much in different districts and situations, and as the nature of the soil may be in its qualities and the surface of the ground be level or hilly. But in some cases, whatever may be the texture of the soil, and whether the surface may be hilly or quite flat, in first stocking such warrens, it may be necessary to form the burrows artificially by some means, so as to facilitate the work of the rabbits and reconcile them to the situation, and secure them from vermin, until they are become familiarized and get disposed to make burrows for themselves. In the executing of this sort of work a ready improved practice for the purpose has lately been had recourse to, which is that of boring them out with an auger, of a diameter sufficiently large to form at once a proper-sized burrow. In level warren lands this expeditious manner of forming such runs may at different times be found necessary and useful; but rabbits in most cases are capable, without difficulty, of making their own burrows.

In beginning to stock with rabbits the proportion of them to the land is different in different districts and parts of them. In some only three couples are put down to the acre; but in others a much larger proportion is made use of as the stock. The proportional number of male to female rabbits is likewise various. In some particular cases one or two bucks or male rabbits are considered as sufficient for one hundred females or does; but this is unquestionably a far greater proportion of females to the bucks than is in common had recourse to in fixing such stock. In warrens in general *one* male or buck is thought sufficient for only *six* or *seven* females at most; and the nearer that proportion can be preserved, the greater will be the stock of young ones which may be expected to be produced, as it is the nature or habit of the males to kill and destroy the young whenever the proportional number of females is too great.

In some instances of first stocking warrens it is found proper, however, to turn down one buck for only two does or females; but without afterwards preserving any sort of regular proportion, as all which are taken are indiscriminately killed until about a fortnight before the end of the season, when the warren man begins to select the breeding does, which he chooses by the size and the breadth of the loins, marking them for the purpose by cutting off the top of one ear. Such does as are inferior, and all the bucks are killed, it being supposed that a sufficiency will constantly remain untaken in the warren; as if they be allowed to become too numerous, the breed is diminished in quantity by their scratching the young ones out of the nests, and destroying them then, or while they are in them. No sort of change or cross in the breed of these animals is ever introduced

or had recourse to; but there can be no doubt, as many have supposed, that such means might be made use of in some cases with propriety and much advantage, as well as the selection of the buck-breeding rabbits as much as can possibly be done.

The sorts of rabbit stock which are in the most general use for warrens in the wild kind are the common grey and the silver grey, as already seen; but in the tame kind, any of the sorts answer well, but the first is probably the most hardy in constitution, as seen above.

SECTION III.—*Breeding and rearing, or raising and perfecting, the Young, in the different Divisions of the Rabbit Kinds of this Country.*

IN these points of management there are many circumstances and matters which are material, and require consideration and nice attention.

WILD SORT.

Though it is, in some measure, necessary to attend to the selection and choice of both the male and female in breeding this sort of live stock in warrens, the former is in common very little regarded in that view, and the latter but in few cases; yet it is evident considerable advantage in different respects would result from it, if it were made possible and convenient to have it more fully attended to, in many cases, of breeding such warren stock, as the animals might thereby be raised more fine and better in their constitutions, flesh, skins, and other useful properties, as has been just seen. By thus picking out the finest and the best formed and constitutioned rabbits of the same kind for this purpose, and occasionally by mixing the different suitable varieties, a very superior sort of this kind of live stock might in all probability be produced in no great length of time, and considerable benefit be thereby afforded to individuals as well as the community in general. This is as necessarily to be attended to in breeding the tame as the wild sort.

The rabbit is fully in the state capable of procreation at the age of from four or five to six months, and sometimes, where there is plenty of suitable food, much more early. The female goes with young rather more than a month; and before she brings forth, she digs a new hole out of the usual line, and prepares a sort of bed of down, which is provided for the purpose from that of her own coat or covering. She is so constant, especially for some days at first, as never to leave her young, except to satisfy the calls of hunger, which she performs in the most speedy manner. In the time while the young are suckled and brought to the proper growth, which is in the course of not more at most than about six weeks, they are carefully concealed and kept from the sight of the buck or male by the mother, in order that he may not be in danger of destroying them; and almost constantly the mouth of the hole or bed where they are contained is stopped up, that the place where they are may not be known to him. In the tame sort the same is likewise the case.

It is found in common that warren grounds will carry as breeding stock from about three or four to six couples on the acre, and allow about eight or ten couple to be killed from that extent of land in the course of each season. It is usual for the does to breed two or three times in the year, and to produce on the average about four young ones at each time; the does of the most early spring broods will also sometimes produce a brood in the ensuing autumn; but in spite of this quick increase, rabbits have so many enemies and difficulties of different kinds to contend with, and besides

are so liable to losses by scouring or excessive purging in the spring months, by the escapes in the time of deep snows, when the walls or banks of the warrens are drifted up, by barren does, by foxes, poachers, and in other ways, that two for one of the whole breeding stock may, in many cases, be estimated as more than the average produce of rabbit stock.

The young of this sort of animals usually make their appearance from the burrows at from three to less than six weeks; and the does take the buck almost immediately after producing their young in the wild as well as the tame sorts. The produce is constantly the largest on new lands, or where the keep is in plenty and of the right kinds.

PROPER MEANS OF KEEPING AND FEEDING.

In rearing or raising wild rabbit stock to most advantage, much depends upon their being well and suitably kept at all times. For though less attention is necessary with them than in most other cases, as they are of a nature and disposition to live and become in good condition where there is apparently but little vegetable verdure on the land, yet it is proper and greatly beneficial, to have such crops raised and provided for them as are the most eagerly sought after and desired, and which answer the most effectually in raising and keeping them in the best manner. These, in the green kind, are all the close sward grasses that answer well on such poor sorts of land, parsley, dandelion, sow-thistle, groundsel, and some others, of the same nature, as rape, red clover, and sainfoin, where the soil is calcareous, which latter different kinds may be raised in suitable patches for the purpose. In the dry and root kinds of food with which it commonly only becomes necessary to additionally feed or fodder them, when the ground is deeply covered with snow for several days together, there are many sorts that serve the purpose extremely well, as fine green hay, and sainfoin hay, which is better; but red clover hay is the best, as being more drying and nutritive in its quality. Of roots, the turnip is probably the best in such cases, as the rabbit can readily discover them by the smell, and they are particularly fond of them as food; but hay, of whatever kind, is liable to be much drifted up and lost in all such circumstances. Other substances are occasionally likewise had recourse to in this intention, as the boughs of the ash-tree, and different shrubby plants and woods, which are found on the warrens, the bark and other parts of which is peeled and eaten, the rabbits being extremely fond of such sorts of food. These different kinds of materials, as food, are to be laid and distributed in proper portions and billets in the different more interior parts of the warrens, that the rabbits may be kept as much as possible from wandering out of them to get food. The proportional quantities of these sorts of food, which are usually given in the times of severe storms, are from about one and a half or two to three large cart-loads of the turnips, with rather less than one such load of proper hay in the day, for one thousand couple of rabbits, as it is always proper and beneficial to use hay with such roots; but where billets of the above kinds are made use of, the proportion of hay may be much lessened. Bran, thrashed, or unthrashed, and cut oats, and other sorts of grain, are also excellent as rabbit food, when given in suitably convenient troughs or other contrivances, and where they can be had sufficiently cheap for the purpose, as small portions will be sufficient in such use. In the hay-making season it would, in most cases, be a convenient and an excellent practice, to have small stacks of proper sorts of hay put near to

the burrowing grounds, or middle parts of the warrens, and surrounded with suitable sod banks or walls, to prevent the rabbits from coming to them; as by this means the rabbits would not only be readily and easily fed in such storms and, at other times, when necessary, but be in some measure induced to keep more at home, and the great losses caused by their straying out of the warrens be prevented; while the sites where the stacks have been set will form excellent situations for burrowing in when the hay is taken away and the bank walls somewhat removed. In deep snows it is always a proper precaution, to have the ditches and other out fences of the warrens well cleared, to prevent the rabbits getting over them and being lost. It would seem, also, to be greatly useful and advantageous in the breeding seasons, and while the young are rearing, especially when there is much rain and wetness, to have some of the above more dry sorts of food made use of, in combination with the natural green keep, in order to guard against the frequent purgings and other bowel complaints, by which so much loss is, in many cases, sustained. In rabbit warrens, near the sea-shore, none, or very little feeding is ever necessary. By these means, rabbits in warrens may, in most cases, be raised in the best and most ready and perfect manner. The most proper modes of cultivating and managing such rabbit-grounds for the purpose will be afterwards noticed.

TAME SORT.

In the breeding and raising rabbits in the tame or domesticated state, to the most advantage, in their different products for their owners and the public, several circumstances and points of practical management are necessary to be regularly had recourse to, well regarded, and fully executed. In the performance of the breeding practice, in these cases, more nice and exact regard is to be had to the selection and choice of the female and male rabbits than in those of the wild kind, and their benefits may be more conveniently and fully put in execution, in both raising them in the same and in the mixed breeds. In choosing the breeding stock of this sort of rabbits, the breeder should pick out the largest, sleakest, hardiest, best-fleshed, most disposed to fatten, and the most perfectly formed in the different points or parts of the carcass, and which have the skins of the best colours and qualities for the purpose of sale, and the uses to which they are to be put; being careful in mixing the different varieties or breeds to have them well suited in their nature and properties to each other, as by such means much improvement in such rabbit stock may soon be produced. The produce of each doe rabbit, in this practice, is usually from about three or four, to eight or nine; however, as it will suffer the young of another to suck it, as it is supposed, by simply using the deception of rubbing the body of it over with the urine of that by which it is to be suckled; wherever the number is too few, the does may be made by such means, if true, to rear and fatten more, so as to have, on the average of the whole, about six, which is the largest number that a single doe rabbit can raise and sufficiently fatten to be ready, at the age of about five weeks, to send to the market for sale. The doe usually takes the buck in less than a month after bringing forth or kindling, and as she goes much about that length of time with young, she is capable of producing about six litters in the year, the value of which is, in most situations, about seven shillings the litter, and the annual money produce which she affords two guineas.

In the tame state, the buck rabbit becomes

fit for use at from four to six months old, and is in perfection from the time he is nearly from two to three years of age. The doe is capable of breeding from the time she is five or six months old, and the most early and certain sign of her being with young is, the nibbling down any of the littery matters that may be about her. While she is in this state, the buck and all other rabbits should be carefully kept from her, as, from the disturbance they may give her, she will be almost certain to cast the young, which is very injurious to her, as well as greatly disadvantageous to the breeder.

HUTCH AND HOUSE MANNER.

The keeping, breeding, and rearing, tame rabbits is, in general, performed in rather small hutches, or a sort of boxes; but in some places and situations, in small houses properly fitted up for the purpose, some of which are in a kind of oblong form, and have the length of more than forty feet, with the width of about nine, and the height of seven or eight, being formed of clay and covered with tiles, having a lean to side shed for putting the food in; the lockers for the rabbits being arranged one above another on the two sides, but so raised from the floor as to secure them from rats and other such vermin. These lockers are each of them about three feet long, eighteen inches in width, and one foot in height, the fronts of them being formed of wire, in the manner of a bird-cage. There is in each locker a drawer for reduced food, and a neat small rack above it, made of wire, for holding clover or other hay. In the breeding lockers, there is an additional one to them, which has some inches in length. In these breeding-houses or sheds great numbers of does for producing and rearing young are kept, which have the bucks or males in the proportion of about from ten to thirteen to the hundred, in which a very large quantity of fine produce is afforded. But a more usual proportion is that of one male to eight or ten females, in this manner of breeding. In every case, it is essentially necessary, to keep all such hutches, boxes, sheds, and houses, frequently well cleaned out and perfectly sweet, otherwise the rabbits will be constantly liable to become diseased, and much loss be sustained. Great care must also be constantly had to keep the bucks and does sufficiently apart from each other, until the latter have kindled or brought forth, when they are again to be turned to the bucks, and to continue with them until they run from and avoid them.

It is usual, in the hutch or box method, to set them to the walls, one above the other, to the necessary height for the quantity of rabbits that are to be kept; but it would save room, where a large stock is to be kept, to have them placed in rows on suitable stands, inclining a little backwards from the walls at a proper distance, so that the rabbits may be fed and cleaned out and underneath in a better and more ready manner than where the hutches stand close to the walls, as well as more perfectly drained and kept sweet and dry. The breeding hutches, or lockers, too, would be more convenient, and give more facility in cleaning them out, by being made double, with a sliding door in the middle, by which the rabbits could be occasionally confined, as single lockers are only wanted for weaning the young rabbits, and confining the bucks in so as to be perfectly separate. The troughs for eating their food out of should be weighty, and so contrived that they cannot get their feet into them to scratch out the food, and dirty and waste it, as is usually the case. Where the intention is to keep the dung pure, no sort of litter should be used; but where it is to be

made use of on the farm, dry litter, such as soft refuse straw, or saw-dust, may be employed with advantage. In all rabbit-houses there should be conveniences for holding the dung, and keeping the necessary kinds of food in the proper state and condition for being used. A short-handled hoe and broom will also be necessary for keeping them properly clean and sweet.

ORNAMENTAL MANNER.

Other modes of breeding, raising, and keeping tame rabbits, so as to produce a more agreeable and pleasant effect, in some situations, is, by having a sort of warren residence made for them in waste lawns, rather retired parts of gardens, or in pleasure-grounds.

In this method, the ground, in some cases, is to be prepared and formed somewhat in this manner: a circle, or any other form, of about forty feet in diameter or extent, is to have the turf pared off from it and laid on the outside, when a ditch is to be dug within it, perpendicular on the outside part, and sloping in the inner, the earth taken out to be thrown up in the middle, in the manner of a hilly ridge, to the height of three, four, or more feet above the surface level of the lawn or other ground, what earth remains being taken away. The turf is then to be laid down all along the raised ridge, and well beaten to settle and render it firm. The ditch should be about three and a half feet deep, and three feet wide in the bottom part, having two, three, or more drains covered with draining stones or iron grates, to take away sudden heavy rains or other wetness, and keep the rabbits dry. In different parts of the outside bank there should be a sufficient number of a sort of alcoves formed, the sides and tops supported either by planks or brick-work, for the purpose of giving the dry food of the rabbits in, which, by their situations, being varied, some will constantly be dry; any sort of neat and rather strong boxes will answer the purpose. Should the ground be very porous and light, the outside of the enclosing side-fence should be a wall, or stakes fixed in the ground, and hurdles or boards nailed firmly to them to within a foot of the bottom, to keep up the bank; the entrance may be either by a plank turning, when necessary, across the ditch, or any other similar neat contrivance. When the turf has become settled, and the grass begun to grow, the rabbits are to be turned in, when they will soon go to work in forming themselves burrows in the sides and hilly raised part of the bank ridge. But it will tend to keep the turf more neat, and induce the rabbits to make their holes more in the sides, if a few holes be made at first by the auger, as they will then soon finish them. Where the whole is surrounded by a brick-wall, it should be raised on pillars, having an arch from each, so as to leave room for a burrow.

The same may, however, be executed at less expense, by simply digging the ditch only to the depth of about two feet, which will give about the quantity of earth which will be sufficient to form the hilly ridge; pales to the height of a foot and a half being put round on the outside to keep the rabbits in the enclosure. They are here to be kept and fed as others of the tame sort; and if saw-dust be put at the bottom, in wet weather, it will be favourable to the rabbits, and greatly increase the quantity of manure, which need not be taken away more than once a week, as the smell will not be disagreeable, though close to a residence. In these cases, should the bucks be troublesome, in destroying the young, they may be confined in one of the alcoves, or some other place, or

be left at liberty. After heavy snows, as the ditches will be nearly filled up, and probably the places where the hay is, the rabbits will need being assisted with food in the manner as above.

There are other similar methods which may be had recourse to, such as the raising and enclosing of large grassy mounds and hillocks, by which, when there is due care taken in feeding and managing the stock, there will be nearly an equal profit produced, and much less trouble and expense occasioned.

METHODS OF KEEPING, FEEDING, AND FATTENING THIS SORT.

In raising, keeping, and rendering the young of these animals in proper condition for being killed, a great variety of different sorts of substances and matters may be employed with success as food for them. Which, in the green moist kinds, are, the tops of carrots, parsnips, the leaves of coleworts, lettuces, and cabbages, with several other kinds; green corn, tares, in their different seasons, cut grass, parsley, dandelion, sow-thistle, groundsel, and some other similar herbs and plants; but in combination with all these sorts of moist food, they must always have a very large proportion of dry meat, of some sort or other, as otherwise they become large and full-bellied, and are soon destroyed in that way. At all times, a very small quantity of drink is only necessary, but which should always be fresh and pure; and when they feed much on any green succulent sort of matters, it should be carefully seen that they do not drink at all, as it causes them to become dropsical and suddenly expire. In cases where grass or other green herbs are cut as their food, it is necessary to be careful that no sort of poisonous woods or plants be mixed with it, which they may eat and be thereby suddenly destroyed.

In the dry and less juicy or watery kinds of matters, which are to be used as food in a more or less full manner, in connexion with the green sorts, there are many substances which answer well when rather abundantly given, which must generally be the case where the animals are to pay well for their keep; such as well-made hay of the red clover kind, pollard, bran, grains, oats, the refuse leaves of tea, after they have been infused and made use of, cut chaff, milk, and some other such substances. Bran and brewers' grains, in mixture, have been found an excellent sort of keep for this sort of stock. And if a little finely-powdered oil-cake were well mixed with a rather large portion of pollard, it would probably be found a very fattening kind of food in such cases. Much attention and care are necessary in the feeding and managing of the rabbits in their early growth, as well as in bringing them to the proper state for the market. They must, in every state, be regularly fed three or four times in the day, or they never succeed properly so as to pay for their keep. In some places, where they are raised, kept, and made ready for sale, in very great numbers, it is the practice, to feed them very early in the morning with the best sort of hay, a few hours afterwards with a mixture of good pollard and fresh brewers' grains, soon after the middle of the day, with some sort of proper green vegetable food, and late in the evening again with pollard and grains; in which management they thrive fast, and make a good return for their keep.

As this sort of rabbit stock is capable of being raised and fed in a good and convenient manner, and at but little cost, as much of their food is of but little value, and some of it may be derived from the waste green food of the garden, they will be found to be very beneficially had recourse to in many rural situations,

by the cottage labourer, little farmer, and different inferior gradations of society, as being productive of much utility in the way of food, manure, and other matters.

It is a very great improvement to cut and keep the young buck tame rabbits, where it can be done, until they are quite full grown, before they are killed as food, the flesh being thereby rendered whiter, finer, and more tender; but this must be effected by having them put in a separate place by themselves, for fear of their disturbing the breeding does. The operation is said to be easily and successfully performed in some places. By the use of large quantities of the juniper shrub in feeding tame rabbits a finer flavour is also said to be given to their flesh, and it is rendered equally good as that of the wild sort.

PROPER MODES OF MANAGING RABBIT WARRENS IN RAISING WILD RABBITS.

This seems yet to have been but little attended to, so as to make this sort of live stock of the most benefit of which it is capable; but as there is land which is more particularly proper for and suited to one sort of stock and management than another, by the nature of its composition and the sort of herbage and keep which it affords, it is necessary to have a particular attention and regard to these points and circumstances, which are so strikingly exemplified in the case of the rabbit, an animal which by its peculiar habits and properties is the most perfectly adapted to the ground which is proper for warrens of any whatever. There are, as has been seen, vast extents of land of this very poor quality in different districts of the country, which can be so properly and beneficially applied to no other purpose as that of the breeding and raising of rabbits; and which strongly display the loss, impropriety, and folly of their not being put to the use for which they were naturally designed, and in which they afford the most individual and national advantage. On this account there have been many errors and improprieties committed, as well as great disadvantages caused in the produce afforded, by the indiscriminate rage for wholly and at once breaking up and destroying old warrens of this kind for the chance of the growth of corn. All such lands as are perfectly proper for this use, are almost altogether incapable of the growth of grain crops in any beneficial manner whatever. Yet steril and poor as such lands are, they are commonly capable by proper management in alternately cropping them, after the rabbits have been suffered to feed on them for some time, to give small grain crops that may not be wholly unprofitable. But to conduct warren lands suitably, in the view of raising rabbits to the most advantage, and getting the utmost profit from such lands, they must be divided into suitable portions according to their nature and extent, and be put under a steady system of management proper for the purpose, such as that of paring and burning the surface in a thin and slight manner, where they are suitable for the practice, for one or two turnip crops; then a suitable grain one may be taken, after which they should be sown down with proper seeds of the grass kind. In such cases a little advantage may sometimes be gained by the corn crops, but the main benefit will be derived from the ground keeping two or three times the quantity of rabbit stock, and these in a far better state of condition; and from sheep having the consumption of the whole or a large portion of the turnips. At the same time there must likewise be different patches of the warrens, which are incapable of tillage, sown occasionally, as they become worn out with suitable different sorts of proper rabbit food, as above. Fresh divisions and portions of such warren land,

so formed and cropped, should be made ready and thrown into the warrens each year or every two years at the farthest. In some few districts rabbit warrens have been somewhat managed in the above manner with very considerable success and advantage How far the rabbits improve the lands on which they are kept is not yet well ascertained, but there can be no doubt of the manure which they afford being very powerful and advantageous in other cases, as will be seen below. There will be benefit arising, too, in the above method of managing warrens from the increase of the dung-hill, and in some other ways.

In these cases, when the lands have been laid down with seeds for the use of the rabbits, they are not by any means to be admitted upon them until they have become perfectly strong and firmly established in the soil; as from their biting so close, they would to a certainty destroy them root and branch, being so extremely fond of them in their young state of growth, which is additionally beneficial, as giving time to have the principal parts of the crops usefully applied to other sorts of stock, and afterwards the rabbits be well supported upon them; when, by continuing for a time in such a state, the ground will again become fit for undergoing the same or a similar system of management.

DESTRUCTIVE ENEMIES OF WILD RABBITS.

The enemies of these animals are very numerous, and some of which they can with difficulty avoid, as they follow them into their retreats, such as foumarts, polecats, weasels, badgers, and foxes; while hawks, ravens, gleads, and other carnivorous birds, are not less destructive of them when they leave their burrowings. The poacher too is a constant enemy of the rabbit. On these accounts it becomes always necessary in the proprietors of such stock to be constantly vigilant to prevent the depredations of such ravagers, otherwise a ruinous loss may sometimes be sustained. They must consequently have particular attention bestowed upon them in the day-time, as well as in the night, to have them effectually protected and rendered safe in their grounds, which is a no less difficult than troublesome business to perform.

In the foumart, which is long and very slender, there is an animal which is frequently particularly apt to prove highly destructive and make vast havoc among rabbit stock, even in their safest places of concealing themselves; as such are the habits and thirst of blood in it, that many more are often destroyed than are capable of being eaten. Nay even one or two such animals may not seldom be nearly able to destroy the whole stock of a rabbit warren, and cause much uneasiness and mischief to the owner, which renders it constantly a matter of necessity to have every such animal killed whenever they are discovered, as they are uncommonly nimble and active in their pursuits of such food.

METHODS OF TAKING AND KILLING THE RABBITS.

There are several different modes of taking the rabbits for having them killed for sale; but those which are the most generally employed are by means of tips or tipes, fold nets and spring nets, all of which have their use in particular cases and circumstances.

MANNER BY TIPES OR TIPPING.

This is in very general use in some districts, and is performed by a sort of trap of the pit-fall kind, formed and set in some part in or near the wall of the warren or some enclosed portion of it, by having a sufficient space of earth dug out, to the depth of five or six feet, under or

close to it; the sides and bottom being walled and laid with stones or bricks, to prevent the rabbits from burrowing, and the top covered with timber on a level with the surface of the ground, a small passage of only about six or eight inches square being left for the rabbits to pass by; in the floor of which is fixed a double trap-door, each side of which is six inches broad and eighteen inches long; the opening parts are made to meet together in the middle of the passage, and are so balanced that they return to their natural horizontal position the moment the rabbit has fallen through them, and become ready for the next that may pass. The entrance to the tipe is constantly kept closed, except when the rabbits are wanted or when the trap doors are fastened; and they are allowed to have a run through for a night or two to render them familiar with and accustomed to the trap or tipe. In this way vast numbers of rabbits are often capable of being taken; as sometimes so great is the run to a particular tipe or trap, as the wind or some other accidental circumstance may chance to be, that if they be not very carefully watched and attended to, the cavity of the tipe will be so filled that great loss may take place from the heat and suffocation that may be the consequence; for if more than one thickness only on the floor of the cavity of the trap be taken at one time, they even begin to sustain injury. Much caution is consequently necessary in the use of these traps, to avoid having them too close or too many rabbits taken in them at once, as thereby much useful food may be destroyed; they should, therefore, be well watched, and when the requisite number is taken, the muces or entrances to them be stopped up.

BY FOLD NETS.

This is a method which is not unfrequently used in taking rabbits, and which, in some places, is thought to be the best. It is performed by means of these nets with cords in the manner described below. Each net is about four feet in breadth, and has the length of from sixty to some hundred yards. These, the day previous to that in which the rabbits are designed to be taken, are to be spread out between the breeding-ground burrows and the feeding-grounds towards the evening, the lower edges of which are to be kept tight to the surface of the ground by short hooked wooden pegs or pricks, and the upper put up with a small sort of net-stakes, about three feet in length, and the thickness of slender hedge-stakes set in upright at short proper distances, by being made sharp at the thicker ends, and driven into the ground; the nets have cords ran through them at the top and bottom in the meshes, so as to preserve them when drawn out, extended in a regular and proper straight line; the top cord being twisted and fastened round the upper end of each of the stakes, to bear the net up, and keep it stretched. The nets are to be first laid and pegged down, and, after the rabbits have gone out to feed, they are to be as quietly as possible raised, and fastened up in the above manner, so as to intercept their return. In this manner much extent of ground on the different sides of the nets may be enclosed, the banks often forming ends and parts of their sides. Wherever there are faults or imperfections in the banks, nets must also be run in them, as the rabbits constantly endeavour much to escape when they find themselves in any way obstructed in their usual retreats. The fore parts of the folding-ground is always left wholly free and open. It is the habit of the rabbit to take its food principally in the more early part of the night season, which, when there is the probability of much rain, snow, or stormy weather, which it is somewhat sensible of, it

usually leaves its home more early, so as to have completed its feeding soon in the night. This is necessary to be well attended to by the warren-man in setting his nets of this kind; for, as rabbits generally form their habitations much together, and usually at a distance from the places where they feed, leaving them likewise in common much at the same time in search of their food, this is the time at which the net-traps may be most conveniently and effectually set for taking them. This is performed by two men, beginning from the different ends, so as to meet in the middle part. In this manner, when the weather is fine and free from wet, nearly the whole quantity which is wanted can at once be taken; but it is usual in most cases to set such nets at two different times for the different colonies of these animals. Great silence and quietness is requisite in setting and putting the nets ready, as rabbits have the habit of giving alarm in case of noise and danger by striking the ground suddenly and strongly with the hind part of the leg and the foot, on which the whole of them instantly set off in return to their retreats. When the enclosures by the nets have been formed, a watch becomes necessary for the rest of the night, as, in case the rabbits should work holes in the nets by eating the thread of the meshes, many of them would get away; and besides they would be more troublesome to take afterwards. Poachers must likewise be guarded against in all such cases.

As rabbits, in cases of this kind, where they find themselves hindered from returning and getting home, continue to run and beat about the nets, what are termed angles are made within them as near as possible to the burrows, which are so contrived as to give them the temporary means of concealment. These are thus formed: a sort of trench is dug in the angular manner to the depth of about fourteen inches, having the width of about twelve, the sod parts, which are taken out, being then set up against each other over the trench in somewhat the ridge form; the different trenches have equal lengths, and are left open at each end, by which means, when the rabbits come to meet in them, they have their heads towards each other, and their hind parts to the person who catches them, when they are taken hold of by the hind legs, which causes the killing of them to be more ready and convenient, as it is by the breaking or dislocating the joints of their necks. The rabbits being prevented from their return to their usual retreats, in consequence of the light beginning to appear, and the noise of the warren-man and dogs, readily run through fright into the angular trenches in order to secure themselves; when a sod is put at the open ends to prevent their escape. What few straggling ones may remain out are run and taken by dogs; but this practice is as little employed as possible, as they are apt not only to tear and spoil the skins, but injure the carcasses of the rabbits.

The way in which they are taken out of these angle-trenches is for a person at one end first to take away the sod that has been placed there, and bring out as many as he can reach; then another person, with a proper spade, works out a suitable portion of the rabbit angle, and draws out all which can be reached towards the first fence; then that person opens another portion in the same way, constantly making the different openings, so that the persons at each of the ends of the trenches can reach to each other from the separate openings. In this and the above methods of taking the rabbits, they are often hunted into the traps and nets on their return from feeding.

This manner of taking the rabbits affords the means of properly selecting and preserving such as are thought the best in shape, colour, or other useful properties, as the whole pass through the hands of the men employed in the business. Such rabbits as are let go are usually marked on the ear or some other part; but the wetness and badness of the weather at such times is always unfavourable for the purpose, and occasionally the cause of the business of thus taking these animals being had recourse to two or three times for the same colony of them, and then to be often imperfectly performed, as every weak and improper rabbit is in good management wished to be taken and killed; for it is the same with this as other sorts of live-stock, that the best of both the males and females are the most proper and valuable for breeding from, as seen already; as weak and unfit animals of either sort are productive of no advantage whatever, but become injurious in different ways.

The number of this sort of nets must be in proportion to the nature and extent of the rabbit ground, and the quantity of it on which they are to be set,

BY SPRING NETS.

These are similarly formed to the above sort, but are somewhat different in the manner of setting them. They are only capable of being made use of to any good purpose when the weather is severe, in which case they are put round hay-stacks, heaps of turnips, and other such matters, or in particular situations of the same kind. The stakes which are to be used in this intention are to be stronger than those for the fold-net, and to have a hole in the top of them, through which a small cord is passed, with the other cords fastened to it, which are also fixed to the net, by which means, whenever a number of rabbits is seen to be enclosed within it, the person who has the care of managing it, who is concealed in some proper convenient situation, draws it quickly up, and includes and secures the rabbits. It is a sort of net which is only in occasional use.

Besides these modes, ferrets and dogs are made use of to force and get the rabbits out of their holes, but the latter as little as possible, as being liable to injure the skins.

FERRET.

This is an animal which is only known here in a sort of domesticated or tamed state, being originally a native of the hot climate of Africa, whence it is said to have been brought into Spain, and in consequence of its well ascertained hostility to the rabbit employed in reducing the vast numbers of them with which that country then abounded; having since been made use of for the same purpose here, and in many other parts of Europe. As, however, from the nature of its origin, it is incapable of bearing the severity of a cold climate, it can only subsist in such by being well protected and with much care. It is of course usual to keep it in a box laid with wool, of which it makes a warm bed for itself. It is in a state of sleep for the most part of the day, but on its awaking, it constantly displays much eagerness for its food, which is usually bread and milk soaked together.

BREED.

There seems to be only one true sort of this animal, which is small and rather slender in its shape, having the length of about fourteen inches, with five inches of tail; it is sharper in the nose than the foumart; the ears of it are round, and the eyes small, red, and fiery; the whole body is of a very pale yellow colour.

As it is an animal which is apt to degenerate and in some measure to lose its native ferocity

in this country, the warren-men are in consequence under the necessity of procuring an intercourse between the female of this animal and the male of the foumart, the produce of which is a breed of a much darker colour than this, and partaking more of the latter sort of animal. It is capable of propagating at an early period, and breeds twice in the year. The female goes six weeks with young, some of which are said to devour their young as soon as they are brought forth, by which they immediately become in season again. They have commonly three litters, which generally consist of five or six each, but in some cases seven, eight or more are produced. It is an animal which has naturally such an hostility to and desire for the destruction of the rabbit, that if a dead one were to be laid before a young ferret, it would instantly seize upon it, notwithstanding it had never seen one before, and tear it to pieces; and if a living one be presented to it, the ferret is still more eager and impetuous, seizing it by the neck, winding itself round it, and continuing to suck its blood until it be satiated or the animal is destroyed.

In making use of these animals in warrens it becomes necessary to have them muzzled, in order that they may not kill or destroy the rabbits in their holes, but simply force them to come out of them, that they may be catched and taken in proper nets, as above. For when they are suffered to enter without muzzling, or when they disengage themselves from the muzzles while in the holes, there is much danger and chance of their being lost, as after being filled and satisfied with the blood of the rabbits, they fall asleep, and are thereby then almost wholly incapable of being come at; but the most usual and best methods of recovering them in such cases are those of either simply smoking or digging them out. When these do not succeed, they continue through the summer among the holes of the rabbits, living upon the prey they find there; but in consequence of their being incapable of enduring the cold of the winter, they are sure to perish at that season.

The ferret is readily and without difficulty tamed, but soon irritated, and wholly incapable of attachment. When enraged it is very apt to bite, and the wound thus made is said to be difficult of cure.

SEASON OF KILLING.

This is usually from towards the latter end of the month of October until about the same time in December, which is about ten weeks; and some time is required in the preparation for the business. In the whole of this time the skins continue fully in season, but at all other periods and times they are different. When the rabbits begin to bring forth about the month of May, the young which are produced take on no sort of change in the skins from their first perfect white coloured appearance, but from being what is termed a white rack, become a whole skin; those which are bred towards the end of March become black; those raised in June are white; when in July, they are black; but when towards the end of November, they are again white, having the skins as well as the carcasses then in full season. This has a relation to the fleshy or insides of the skins when stripped or taken off from the bodies, which should always be quite white, without having a single black spot on them, to be in the best perfection.

CUTTING THE SKINS.

In this business, which is sometimes performed by the occupiers of warren farms themselves, the process proceeds somewhat in this manner. The skins are in the first place cut

open down the belly parts; they are then damped and stretched quite flat one upon another, when a heavy weight is placed upon them to keep them in that state; after which, the down or wool is to be shaved off them with a very sharp semicircular instrument, somewhat similar to the saddler's cutting knife; which is divided and put, as the work proceeds, into five different sorts; the best, which is from the back parts, worth some time ago about 20*s*. the pound; the second, from the breech parts, worth 18*s*. the pound; the third, from the belly and throat, worth 16*s*. the pound; the fourth, from the head, termed "pate wool," worth 14*s*. the pound; and the fifth or last sort, from the tail, worth 12*s*. the pound. When in season, each skin will produce about one ounce of wool or down. The work is capable of being performed by women at the expense of about 2*s*. 6*d*. the dozen. The same may be done with the skins in the tame sorts of rabbits where necessary.

SELLING THE KILLED RABBITS AND THEIR SKINS.

It was usual for the owners of warrens, in many extensive rabbit districts, formerly to dispose of the year's killing of this sort of stock by the hundred of six score, commonly to within some late years, at about 13*l*. the hundred, they being, for the most part, sold to little dealers in shops, who made a sort of trade of it, by having persons to keep stalls in proper towns and places for selling the carcasses; but it is since become the practice of such farmers, in general, to send such produce in proper covered carts or carriages, containing six or eight hundred couples, strung on rods, and suspended crosswise in them, one tier above another, to the proper places for selling them, and to have the carcasses retailed themselves, dressing and preparing the skins, as above, for the best markets. In the latter of which intentions they have a room for drying them in, with a small convenient charcoal fire-place, and suitable contrivances for hanging them up to become dry. A proper person who understands the business is also employed for clearing off the fatty matters that may be present. The whole of this sort of work usually takes up about five weeks to have the skins perfectly cured and ready for sale.

Where the skins are not cut and prepared, they are dried and kept safe until the end of the season, and then disposed of by the pack to those whose particular business it is to cut the fur from them. All skins which are produced out of season, with those which are any ways broken or injured by dogs or otherwise, though had in season, are considered as half skins only. The tame rabbit is in general sold while quite young, but sometimes in the fattened full grown state, when it may soon be made sufficiently fit in this intention, by proper full keeping with the better sorts of food of the rabbit kind, the skin being sold for different uses.

EXPENSES AND PROFIT.

These will be materially different, as the nature of the ground, the extent of the warren, and the kind of management which is pursued may be; but in most well-conducted rabbit farms they will stand somewhat as below, as has been stated from the actual management of such sorts of farms in many instances.

IN THE WILD SORT.

In cases where the value of the land which is applied to this use is the highest that should ever be put under such a system of cultivation and management, they will in general be found to be not less than these on a thousand acres, and in nearly the same proportion on any less number, the soil and circumstances being similar:

EXPENSES.

	PER ACRE. £	s.	d.	£	s.	d.
Rent	0	6	0	87	10	0
Rates	0	1	0			
Fencing in	0	1	3	16	16	4
Warrener, &c.	0	3	2	40	0	0
Extra labour in killers	0	1	6	19	0	0
Nets, traps, charcoal, &c.	0	0	2	2	1	6
Horses	0	0	6¼	7	4	0
Winter food	0	0	0	10	0	0
	0	13	7¼			
Powder, shot, &c.				2	0	0
				184	11	10

PRODUCE.

At 2 couple on the acre, or 2000 couple at 9*d.*	75	0	0
Skins at 1*s.* on the average	200	0	0
	275	0	0
Expenses	184	11	10
Profit	90	8	2

But this profit is not unfrequently much exceeded, as the winter stock is often three couple on the acre, and the produce killed five or six. On such breadths of warrens the stocks are not unusually much larger, as from two thousand to two thousand six hundred couples, and the number killed annually more than five thousand couple, which make very great differences in the profits which are derived from them. As the expense of the cultivation and conducting of rabbit warren farms is but little when put in comparison with that of most other uses to which such sorts of poor lands can be applied with success, and that of keeping the stock, no great length of time or of much cost, as rabbits come speedily to profit, and there is little danger of loss, it is probably, on the whole, the most beneficial purpose to which such soils can be converted for the advantage of the proprietors and the nation in general. There is, also, the profit of other sorts of stock and produce to be taken into the account.

IN THE TAME SORT.

When these kinds of rabbits are kept, the profits which they afford will be much in proportion to the attention which is bestowed upon them, and the manner of their being kept; but as they will breed a great number of times in the year, and produce from six to eight young ones at each time, it will seldom be less than from one to two pounds for each breeding doe; as the manure will nearly defray the cost of their keep and attendance, and the value of the skins be considerable in the winter season, especially in some sorts, from which an additional profit may be derived. But the great benefit of keeping the tame rabbit is in the flesh for the purpose of food, which is much larger in quantity in it than in that of the wild sort, consequently of more value.

Section IV.—*Diseases of Rabbits.*

These are somewhat various as affecting the wild and tame sort, in consequence of the difference in the nature of the manner in which they are fed and kept, the exposure to which they are differently subjected, and their habits of having their food in the field or the house. The rabbit is not, however, much liable to disease either in the wild or tame state.

IN THE WILD SORT.

The disorders in this kind are but few, as their feeding is natural and regular, with very little variation in any way whatever. The principal complaint to which they are liable and exposed is that of the

SCOUR OR PURGING,

Which, in many cases, is very violent and destructive, wearing and wasting the animals away until they become quite exhausted. It usually takes place in the more early spring months, when, after rain, there is fine warm weather,

with a sudden flush of grass of the more rich kind for the sort of land on which they are usually kept. The only convenient and practicable means of removing the complaint, is that of changing the nature of the feeding in the animals by giving them fresh portions of some of the proper sorts of food that has been advised to be sown in different patches and separate parts of the warren enclosure, and confining them to it as much as can possibly be done. Of the different sown patches, those with parsley, sow-thistle, dandelion, groundsel, and sainfoin would probably be the most suitable and afford the greatest benefit in such states. They are the best when they operate considerably in other ways, without affecting or disturbing the bowels in any great degree.

It would also be highly beneficial if at the same time some sort of dry food could be had recourse to by them, such as good hay of the sainfoin or red clover kind, and any other substances of a similarly dry quality, whether of the hay or mealy sort. These with suitable shelter, where it can be had, will soon remedy all such affections in these animals without any great trouble, difficulty, or expense, and a loss, which is often considerable, be prevented.

LOCAL DROPSY.

This is another complaint with which the warren rabbits are occasionally affected. It usually arises from too much feeding on over succulent plants, or grassy herbage, without the use of sufficient dry keep, whether of the grass or other kinds.

It is known by the animals getting at once large in the belly, and dying in rather a sudden manner. The most effectual mode of removing and preventing the disease is, probably, that of the free use of full-grown parsley and sow-thistles, with hay, where there are a number of rabbits so affected at the same time.

These are the two chief complaints to which the rabbit, in the state of nature, is liable and exposed; but when raised and kept in the house, it is subject to some others.

IN THE TAME SORT.

In the tame state, the rabbit is apt to become affected with what is termed the

ROT,

which is a sort of sudden wasting and atrophy, that is often quickly fatal to the animal. It is supposed to have its origin in the animals feeding too much on very juicy food; or that which is newly collected, and has the moisture of rain or dews hanging upon it, as it is over moisture, in or on it, which constantly seems to produce such affections. The remedy, in these cases, is to give better and more suitable food than that which the rabbits have been usually accustomed to have, and letting their green meat be sufficiently dried before it is given them, carefully intermixing a suitable proportion of proper dry keep with it, by means of which the hurtful effects resulting from it may be wholly or greatly prevented and guarded against. The usual green and dry food should likewise be relinquished, and other sorts of both be made use of in their stead. In these ways the rabbits will commonly be soon restored.

MEAGRIMS.

This is a sort of frenzy or madness, with which rabbits of this kind are not unfrequently seized in a sudden manner. It is believed to arise from the rank quality of their keep, but may perhaps be induced and brought on by some other causes, such as being too closely confined, the want of proper air and cleanness in the hutches or other places, and other causes of the same kind. It is known to be present, by the rabbits suddenly tossing themselves about in an odd manner, turning their

heels upwards, and leaping or jumping oddly into their hutches or other such places. In regard to the cure, it may, in general, be effected by letting the rabbits feed but in a sparing manner, and giving them suitable sorts of green feed, such as the sow-thistle, and others of a similar nature and quality, in rather a limited manner, the hutches and other places being kept constantly well aired and perfectly sweet.

SCABBY INFLAMMATORY ULCERATION.

This is a very troublesome and unpleasant complaint, to which tame rabbits are sometimes subject. It is a sort of scabby ulcerous affection which takes place in different parts, but chiefly behind the ears and about the shoulders, producing large, flaky, eruptive scabs, with much of an itching, irritating, thin, sanious discharge, In some cases it is tedious and difficult of being cured, as the animals are apt to be continually rubbing and scratching the parts. But the best and most ready means of accomplishing the business is, by having the diseased rabbits immediately separated from the rest of the stock, and their hind legs being so hoppled as to prevent their using them in scratching the parts; a wash or plaster, or both, such as below, may then be found useful, in wholly removing the disease.

Take of—Sulphate of zinc, ten grains; dissolve it in
Soft water, three ounces,
Diluted solution of subacetate of lead, one ounce and a half; mix and make them into a wash; a little of which may be used to the parts, by means of a soft linen cloth, two or three times in the day.

Take of—Compound lead cerate, one ounce and a half,
White precipitated mercury, twelve grains; rub it well with a little
Olive oil; and then mix them intimately together, so as to form a soft cerate; which may be spread thinly on a rag or pledget of tow and applied, after washing the parts as above or, in slight cases, alone, without the wash.

These are the main diseases to which the wild and tame rabbits of this country are liable and exposed.

SECTION V.—*The Application and Uses to which the several different Parts of these Animals are appropriated.*

THESE are various and important, as they relate to the quantity of animal food which they supply to the public; the value and advantages of the fur which they afford for different manufacturing purposes; and the nature and utility of the manure which they produce, when made use of as a top dressing to the soil for certain crops, or in other ways.

FLESH.

This part, in these animals, is perhaps next to that of the young fowl, in delicacy, lightness, and readiness of digestion, as well as in its nourishing properties. The average quantity of meat of this kind, which is supplied by the rabbit, is likewise considerable, as being more than two pounds each, which in the produce of this sort of live stock on a warren enclosure of a thousand acres, would be much above twenty-thousand weight, which is equal perhaps to more than five hundred of the smaller sorts of sheep, as being annually produced, while they require three years to bring them into the proper state for consumption. The rabbit, therefore, in the view of supplying food for the use of the public, is not, by any means, to be despised or disregarded; and when the amount and utility of the product it gives in its coat or fur, which is more than an ounce each on the average, or upwards of 10,000 ounces weight, worth each year, at least, near five hundred pounds, which is probably equal to the fleeces of nearly two thousand sheep, the value of the coats of which is not more than four or five shillings each; it is a sort of animal stock that is to be looked to with

attention, as being raised on lands which are, in a great measure, unfit for other purposes of either keeping, feeding, or fattening, any other sorts of animals, which have a larger growth.

SKIN.

The use of the fur of the rabbit skin is valuable for many manufacturing and other purposes, as has already been fully seen.

DUNG.

Though it has been stated and supposed, that rabbit stock do not produce improvement in lands, which may perhaps, in some degree, be the case, in consequence of the smallness of the quantity dropped and deposited at any one time in one place, and the washing and drying effects of the weather, which, in the usual situations of such grounds, must be very considerable, so as to carry away and dissipate the chief part of the fertility they deposit by their dung; yet there can be no sort of doubt but that rabbit dung is highly enriching and valuable in its nature and qualities, as is sufficiently proved by the trials of it in different districts for various kinds of crops, and in different modes of employing and applying it. The nature of rabbit-warren land, too, where properly suitable, may have some share in the want of improvement in them, which seems to take place under that system of management; as from their poor, steril, and unproductive constituent principles, they are wholly incapable of gaining much improvement in any way, or by any system or means whatever. But besides, the dung of some other sorts of animals, when dropped scatteringly in the field, even where the soil is good, does not much more improve the land than that of the rabbit; so that there is nothing extraordinary in the deficiency of improvement under the rabbit system. The lands to which rabbits are properly suited, and on which they can only with propriety and advantage be had recourse to as stock in the warren system, are of a quality wholly incapable of producing that sort of grass on them which is proper and fit for either raising or fattening larger animals, or for being made into hay of any useful quality for such purposes.

It is the dung of the tame rabbit which is collected, and employed as a manure to land, and which is so greatly esteemed in particular districts and situations for the effects and advantages which it produces. It is found to afford much benefit in several different methods of using it as in arable cultivation, when well mixed and incorporated with the earthy parts of the soil, as well as when simply sown by the hand over the surface when the ground is in crop, as a dressing in that way. When employed in the latter method, it is also a great improver of all the more cold kinds of grass land: in each of which applications there is a ready and powerfully vigorous state of vegetation produced in the crops, such as can scarcely be given by any other means. It is, however, a kind of manure which has hitherto been but little subjected to the examination of the chemist, on which account its constituent principles and real properties are but indifferently understood, and far from being perfectly and satisfactorily known; it seems notwithstanding, from the effects which are produced by it, that it is capable of being made use of to the greatest advantage when put in or upon the land in its rather fresh state, before it has run into or undergone much decomposition by the fermentative or putrefactive process, and in not too large a quantity, as about twenty bushels to the acre. It would, in all probability, go much farther and be more beneficial in its effects, in certain cases, if used in the more

reduced powdery state after being kept dry, so as to be put in by the drill at the same time with the seed, as is done with rape-dust and some other such substances. It is not improbable but that it would be found nearly as powerful in its effects as that of the pigeon when put upon strong cold-soiled lands, under red clover or other such crops in the autumn, in not more than the proportion as above. But when used in too large quantities on such soils, and put on at such a season, or in the early spring, when succeeded by heat and dry summer weather, it is apt to injure or destroy the roots of the grass plants, so as to cause a brown unpleasant appearance, and prevent their vegetating until late in the year.

In some places, the raising and providing of rabbit manure is a material object, and proper buildings are formed, and such animals kept in sufficient numbers for the purpose. Some persons find them so beneficial that from two to three hundred make a load of the manure in the course of the week; and, as two such loads are sufficient for dressing an acre, such a number are the means of completely manuring twenty-six acres in the year, which is a considerable profit and advantage, without considering the value of the flesh and skins. In other cases, one hundred and forty doe-rabbits, with the bucks and their young produce, make twenty-four bushels of manure in the week, which is worth sixpence the bushel, and sufficient for dressing more than an acre of land.

Thus the rabbit, though so small an animal, is very productive of benefits and advantages in both the wild and the tame state.

Chapter X.—LIVE STOCK.

DOGS.

Section I.—*Nature, Circumstances, Character, Descent, Uses, and Kinds.*

The dog is so important in its fidelity, and the services of it in many cases so essential to man, that it is by no means improper to be noticed here in some of its more useful kinds. There is, probably, no animal in nature of greater utility to the domestic interest of mankind, or which is more easily capable of modification and change by the variation of food, climate, and training, than the dog. This is not only the case in the form of the body, but the powers, habits, and dispositions, of the animal are materially altered and diversified. There is, indeed, scarcely any thing that remains in any degree constant, but the internal structure, which is always similar. For suiting it to a variety of different uses and purposes there is a diversity in the size, the figure, the length of the nose, the form of the head and face, the direction and length of the ears and tail, the colour, the quantity and quality of the hair or coat, and in some other particulars; so that it would be equally impossible to determine the distinguishing circumstances of each kind, as to decide on the stock from which they have been originally produced. There is, therefore, only this certainty, that at all times the dog has been found to be possessed of qualities which are well suited to the different uses to which it was at such periods particularly fitted and appropriated. It has been fully seen that those animals which have long been under the care and dominion of man, rarely or ever preserve the mark of their natural distinction in the original pure state. While in wild animals

which still maintain their natural freedom without restraint, and which are free and independent in the choice of food and climate, this mark is constantly, strongly, and fully impressed and preserved. Those, however, which have been subdued by the powers of man, and driven or transported from climate to climate, and greatly altered in their food, habit, and modes of living, must of necessity have suffered and undergone the greatest variations in their form; and as of all other animals of the domestic kind the dog is most subject to this sort of influence, is indued with properties the most tame and subservient, is capable of almost every kind of impression, and obedient to all kinds of restraints, it need not be a matter of much wonder that it should be liable to the greatest variations possible.

It is particularly curious, and in some measure extraordinary, to the nice, exact, and attentive observer, to mark the numerous ready changes and peculiar combinations of forms that arise from a mixed intercourse among these animals, which are invariably everywhere displayed, and which put particular arrangement somewhat at defiance. However, in whatever point of view the almost endless mixtures which now abound in these animals, may be regarded, it may be fairly and reasonably supposed that the dogs which attended, guarded, and preserved, the herds and flocks of mankind in the early stages and states of society, were the first in demand for preserving and keeping the power and superiority of man over the various animals which became necessary for his use and support. It is consequently here only intended to consider these sorts, and those which have been found useful in conducting, protecting, gaining, guarding, and securing, property, whether of the herd, flock, or other kinds.

The dog has, therefore, been unquestionably, at all times, and is still, of the greatest utility and advantage to mankind in his fidelity, and the variety of his services; and especially in those of these different kinds, as enabling them not only to overcome and manage the various animals, that it formerly became, and is yet sometimes, necessary for them to tame and familiarize in a better, more easy, and more perfect manner, but to render their property of various sorts more safe and secure, as well as to guard it when in danger of being lost in a variety of cases.

The distinguishing generic character of the dog, as given by naturalists, is this: fore-teeth, upper six; lateral ones longer, distant; intermediate ones lobate: lower six; lateral ones lobate; tusks solitary and incurvated; grinders six, seven, or more, in some than in others.

APPELLATIVES, OR USUAL NAMES.

The *male*, when full-grown, is called a *dog;* the *female*, when complete in its growth, is termed a *bitch*. The young, when first brought forth, has the name of *whelp* given it; when a month or two old that of *pup* or *puppy;* and in these different states the *male* has the epithet of *dog-whelp*, and *dog-pup* or *puppy;* the *female* that of *bitch-whelp*, and *bitch-pup* or *puppy*.

TEETHING.

In the young dog, when first putting up its teeth, they are much more white, soft, and porous in their nature, than afterwards, when they become yellowish, firm, strong, and fit for tearing fleshy and hard bony substances to pieces. Young dogs should consequently be fed with the less hard sorts of the matters of the latter kind.

ORIGIN.

The dog, in consequence of its having been retained for such a vast length of time in the

tamed or domestic state under the subjection and care of man, has its origin involved in great difficulty and uncertainty; but, as wild dogs seem to have been discovered by travellers in large troops together in some places, as in Congo, the Lower Ethiopia, and in the district of country towards the Cape, it is not by any means improbable that they may in some way have originated from these, notwithstanding some late naturalists are unwilling to allow that such wild dogs constitute a real and true sort in the natural state, supposing them to be rather the descendants of such dogs as have been once domesticated, and have afterwards relapsed into a state similar to that of primitive wildness. It is not, however, consistent with nature and the experience which we have had, that animals which have *once* been *perfectly* subdued and tamed in the domestic manner ever return to their native wild condition. Besides, better and more full proof is wanting than any which has yet been adduced to substantiate the fact in this case. Of *these* wild dogs, however, some are stated to be red-haired, with slender bodies, and the tails turned up at the end, in the manner of the greyhound's; others have a resemblance to the hound, with various casts of colour; the ears are erect, the size that of a large fox-hound: these dogs are said to "destroy cattle, and hunt down antelopes and other such animals as our dogs do the stag. They run swiftly, have no fixed residence, and are very seldom killed, being so crafty as to shun all traps, and of so sagacious a nose as to avoid every thing that has been touched by man. They go in large packs, and attack lions, tigers, and elephants; and among the sheep of the Hottentots they commit terrific ravages. Their whelps are sometimes taken, but as they grow old become so ferocious that they cannot be domesticated." In this account there is certainly nothing which in the least warrants the supposition of such dogs ever having been in the perfectly domesticated state, but the contrary; consequently, it would seem to be rather a notion hastily taken up, than resting on satisfactory proof and authority.

However this may be, there is not less difficulty and doubt in tracing the origin of the dog to the wolf, as has been done by some; nor even to the jackall, though still more probable, as there are many circumstances that throw difficulties and objections in the way. The matter must, therefore, be left on the grounds which have been stated above.

BREEDS, OR KINDS.

Of the different breeds or sorts, and varieties, of these useful kinds of dogs, that of the

SHEPHERD'S DOG

is the tamed kind of these animals, which is most generally considered to have the nearest relation to the primitive race or family of any, and to be the apparent stock from which all the rest have proceeded. It is at the head of the farm dogs, and distinguished by its upright ears and remarkable hairiness of the tail underneath, and is an extremely useful animal, which on all occasions is found faithful to its charge, and which, for the most part, presides at the head of the flock or herd, where it is often more effectually heard and attended to than even the voice of the person who has the care and charge of the animals. The consequences of its care, vigilance, and activity, are those of safety, order, and regularity, in the stock of the store-master and farmer.

This sagacious and attentive animal is of very considerable importance in many extensive tracts of land in different parts of the island, which are wholly applied to the feeding or pasturing of sheep and other sorts of cattle

stock, on which immense flocks and herds may generally be seen ranging to very great distances, apparently without any sort of control, their keepers being alone the shepherd, and his dog, the invariable associate of his toils and labour, ever prompt and ready in the reception and execution of his commands, being the constant watchful guardian of the flock, preventing the straggling, and keeping the whole together, conducting them from one part of such pasture lands to another, and not suffering any strangers to mix with them, but carefully keeping away all intruders. The well-trained dog of this kind, in driving them in numbers to any distant part, never neglects to restrain and confine them to the proper road, but watches every turn that leads from it, where it takes its stand, threatening every delinquent, and pursuing stragglers if they should escape, and bringing them into order again without doing them the least injury in any way. In case the herdsman should at any time be absent from the stock he depends upon the dog for preserving and keeping them together; and as soon as ever he gives the well-known signal this faithful animal directs them to his master, though at ever such a distance.

There is a peculiar singularity observed in the feet of this sort of dog by some, which is, that it has one and sometimes two extra toes on the hind feet; but which are of little use. They are seemingly destitute of muscles, as they hang down in a dangling manner at the hind part of the setting on of the foot, more like an useless excrescence than as a necessary part of the animal. They may, however, have some particular use in such dogs. They are unnoticed, however, by the best naturalists, and the same circumstance happens also in the hind feet of the cur dog. This breed or sort of dog is most probably preserved in a greater state of purity in the more northern parts of the island than anywhere else, where its assistance is so very highly useful and necessary in keeping the vast herds and flocks of sheep which are bred and reared in these very extended and dreary regions.

CUR DOG.

This is also often a trusty and very useful dog of the store-master, grazier, and farmer; and, though not distinguished as a distinct sort, is in such common use in the northern and some other parts, and so much care is bestowed in breeding and rearing it, that it may be considered as of somewhat a permanent kind.

It is larger, stronger, and more fierce, than that of the above kind, and the hair of it is shorter and more smooth. It is, for the most part, of a black and white colour; the ears are half pricked up; and it is often whelped with a short stumpy tail which appears as if cut off, in which state it is termed *self-tailed.* It is generally employed in driving and directing cattle, in which way it is found very useful. It bites very keenly; and, as the attack is constantly made about the heels, the cattle are without any proper defence against it except by kicking, on which account it becomes more than a match for the bull, which it soon causes to run. Its sagacity is unusually great. It is said to know its master's fields, and to be particularly attentive to the cattle which are in them. This is probably, however, only by dint of habit and training for the purpose. A well-trained dog of this sort watches, goes his rounds, and if any strange cattle dare to appear among the herd, it quickly flies at them, though without bidding, and with keen bites soon forces their removal.

The dog which is in common use in driving cattle to be slaughtered, and in other ways, is

somewhat of the same kind; and as such dogs have sometimes to encounter long journeys, both great strength and swiftness are necessary. They are, consequently, in most cases, of a mixed nature, uniting in them the different qualities of the shepherd's-dog, the cur, the mastiff, and the greyhound, and in this manner to be rendered more extensively and variously useful, as well as the main purposes of domestic utility be more fully and completely served.

BULL DOG.

This is a dog of very great courage and fierceness, which is low in the stature, but of vast strength and muscular power in comparison to the size. It is short in the nose, and the under jaw has a projection over the upper, which gives it a fierce terrific look. Its manner and determined courage, in attacking the bull and other such animals, are well known and perfectly understood; its fury in seizing them, and its invincible pertinacious obstinacy and perseverance in keeping its hold, are very extraordinary and remarkable. Its aim is constantly at the front part of the animal, and it mostly fastens upon some part about the face, as the nose, the lip, the eye, the tongue, or some such parts; where it continues to hang in defiance of all the powers and efforts of the animal to dislodge, disengage, or throw it off. Even when maimed and mutilated in its several parts, it is known to attack and seize the animal with the same eagerness as when perfectly sound and whole.

It is a sort of dog that constantly makes its attack without barking, so that it is always hazardous, and sometimes dangerous, without particular caution, to approach it alone. It is a sort, however, which is now less common than formerly, from the barbarous vulgar custom of bull-baiting being properly much laid aside and discontinued.

MASTIFF.

This is a kind of dog which is larger, and of more strength and power than the bull-dog; the ears are more pendulous; the lips large and loose; the look grave and sullen; and the bark loud and terrific. It consequently appears formed in every way for the great trust reposed in it, of guarding, protecting, and securing such property of value as may be intrusted to its care. Yards, gardens, houses, and other such places, are, in some measure, safe, while in its keeping, from the depredations of robbers. Being confined in the day, as soon as the doors or gates are closed and locked at night, it is left to range at perfect liberty; it then passes round the places, looks at every part of them, and by loud and deep-toned barking, intimates that it is ready to defend the charge intrusted to its care.

Three of these dogs have been reckoned a match for a bear, and four for a lion. The mastiff of this country has long been held in high estimation; but in the pure and unmixed state, it is now very seldom to be met with. In general, the dog of that name would appear to be a compound of the bull, ban-dog, and Danish mastiff.

DALMATIAN, OR COACH DOG.

This dog, which has been distinguished by different improper names, as the *Danish dog*, and the *harrier of Bengal*, is now common in this country, and often kept as an useful and elegant attendant of the carriage. It is white in its colour, but somewhat regularly marked all over with numerous black spots, which give it a handsome fine appearance. But the absurd and foolish practice of cropping the ears of the animal to heighten its beauty, or some other silly purpose, should be laid aside as wholly useless, cruel and improper, in such in-

tentions. It is said to have been very long known and domesticated in Italy, and to have been in much use, not for the carriage, but hunting as a harrier.

TERRIER.

This is a sort of little dog which has a very acute and nice smell, and which is particularly expert in hunting and forcing different kinds of burrowing animals from their holes, coverts, and retreats. It is the determined and inveterate enemy of every sort of vermin. It is fierce, keen, and extremely hardy in its nature and habits; and in its encounters with different savage enraged animals, often becomes very severely handled, which it bears with great fortitude, courage, and resolution. An old well-trained dog of this sort, not unfrequently proves more than a match for the hard bitings of the badger.

Of this sort of dog there are two breeds, kinds, or varieties; one of which is rough-haired, short-legged, long-backed, and of much strength. It is most usually of a black, white, or yellowish colour mixed with white. The other is quite smooth and sleak, and beautifully formed in its several parts, having the body more short, and the appearance more brisk and lively. It is, in general, of a reddish brown colour, or black, with tan-coloured legs. It is similar to the rough-haired sort in its faculties and disposition, but inferior to it in size, strength, and hardiness of constitution.

The determined hostility of these dogs against rats, mice, and vermin of every kind, renders them extremely serviceable in many situations and cases.

NEWFOUNDLAND DOG.

This is a kind of large dog, which is rendered of much value in many situations and circumstances, by its great sagacity, and the particular attachment which it has to its master.

It is a breed or sort which was brought originally from the country of which it bears the name; and where its great strength and docile disposition render it particularly useful to the inhabitants and settlers on the coasts, who make use of it in bringing down wood from the interior parts to the sea-side; three or four of such dogs, when yoked to a sledge, are capable of bringing from two to three hundred weight of wood, piled upon it, from the distance of several miles, with great ease and facility; they are unattended by a driver, or any person to guide or direct them; but after having delivered their loading, they immediately return to the woods again, where they are in the custom of being fed with dried fish and other provisions, as a reward for their labour and industry.

These dogs are large in size, and sometimes web-footed; they swim well and fast, dive easily, and bring any thing from the bottom of the water. In their pure state, they are naturally fond of fish, and such sorts of provisions, in the fresh as well as the dried state.

LARGE ROUGH WATER-DOG.

It is a large, rough, curly, woolly-coated dog, which is much web-footed, swimming with great ease and readiness, being greatly useful in the hunting of wild ducks and other birds of the aquatic kind, in the decoys or other places. And in consequence of its aptness in fetching and carrying, it is occasionally kept on board of ships, and in other situations, for the purpose of recovering any thing that may have been dropped in the water, as well as for being ready in picking up birds that may have been shot and fallen into the water in any situation.

Of this dog there is a sort or variety which

is much smaller than the above, but they are both remarkable for their long, shaggy, woolly coats, which often inconvenience them in no small degree, by their covering the eyes so much.

These are the principal sorts of dogs that are of much utility in the management of the store-keeper's stock, or in other ways, for the different uses and purposes of domestic economy and security. The several forms and representations of them, as shewing their different characterizing distinctions, points, and parts, may be seen in the subjoined *plate*.

SECTION II.—*Breeding, rearing, or raising and fitting, these sorts of Dogs for their particular Uses, with their Advantages and Benefits.*

THE principles in the practice of breeding dogs are, in some measure, the same as those employed for producing other sorts of animals of a domestic nature; but besides good selection in the particular kinds, and providing the particular breed or sort from these, it becomes occasionally necessary, and of great use, from time to time, to have recourse to a cross with a very superior sort, which is not too nearly related, as well as at times with dogs of other different kinds, which possess peculiar useful properties that are needed in the dogs which are to be raised. Thus, in some cases, the qualities of the shepherd's dog, the cur, the mastiff, and the greyhound, are united and found useful; and in others, those of the mastiff and the bull or ban dog, or both; and so in the other sorts of these different kinds of dogs, care being always taken to suit them well to the nature of the dogs, and the uses for which they are designed.

REARING YOUNG DOGS.

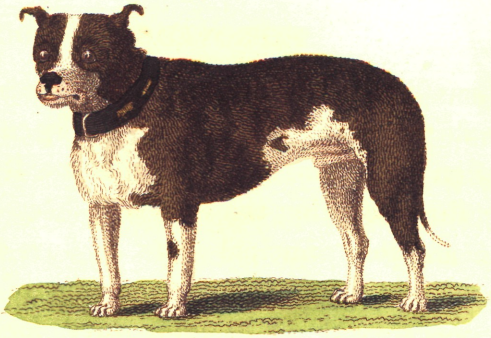
In the raising of young dogs, after having been suckled by the mothers for the few weeks which is usual, the same sort of attention becomes necessary as in rearing other kinds of domestic animals, only in somewhat a less degree. The young dog should be well and regularly fed, whatever may be the nature of the food which is made use of for the purpose; but for the dogs which are not wanted to be too keen, severe, and savage, in their nature and uses, the feeding should consist of not too much of the animalized kinds of matters, yet have some small proportion of them in mixture or combination with different mealy and other suitable substances; while in such as are required to have great strength, with much keenness and severity of disposition, some sort of animal food should wholly, or in a very great degree, be had recourse to in the raising them. Sheep and cattle, as well as coach dogs, commonly do very well with the refuse, fleshy, and bony materials of the house, and barley-meal, softened by means of pot or other liquor; but the mastiff, the Newfoundland, and the water-dog, stand in need of some sort of waste flesh meat, as their principal daily food, with only a small quantity of soaked barley or other meal, to feed them in the best and most proper manner for their different uses and purposes. Whatever may be the sort, nature, or quality, of the food which is employed in this way, great care should always be taken, that the dogs have a daily plentiful supply of some sort of fluid as drink, such as water, or that mixed with some other kind of proper liquid, which is convenient and at hand, as by care and attention in this respect, they are not only raised in a better and more perfect manner, but preserved more fully in the state of health, and some of their diseases wholly prevented from taking place, as dogs are more frequently injured by the want of a full quantity of drink, than many other kinds of animals, and more

Useful Domestic Dogs.

Cur or Cattle Dog



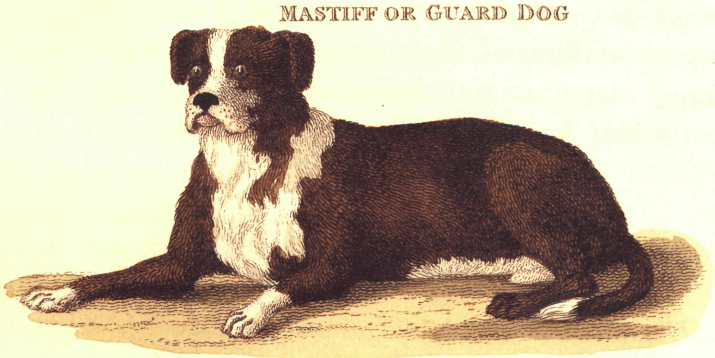
Bull or Beast Dog



Rough Water Dog



Mastiff or Guard Dog



Dalmatian or Coach Dog



Shepherds Dog



Newfoundland or House Dog

Terrier or Vermin Dog



London Published by Thos. Kelly 17 Paternoster Row. Jan.11 1823

liable to become diseased in consequence of it.

TRAINING YOUNG DOGS.

This is a point of practice in raising and fitting dogs for their different uses, which is of material utility and importance; for it has been conceived that if the dog species had never existed, and lent their aid and assistance by these means, man could never have conquered, tamed, and reduced, other animals into the state of slavery; nor still be capable of hunting down and destroying noxious, hurtful, and savage beasts. Consequently, that for his own safety, and to render him completely master of every thing on the earth, it became necessary to form a party among these animals, to conciliate them by caresses, and secure their attachment and obedience, in order to oppose them to those of the unruly, destructive, and ferocious kinds. Hence the training of the dog would seem to have been nearly the first art invented by man, the result of which was the conquest and peaceable possession of the earth and the various animals upon it.

In the view of rendering this very necessary art of the greatest use and advantage, it should be begun with as early as possible, as from the time at which the young dog ceases to be suckled or is weaned, and be continued until it becomes of full growth; as in this length of time it becomes perfectly habituated and accustomed to the necessary modes of proceeding in its different uses, which get quite fixed and incapable of change in the young animal; while where they are late in being begun, and continued only for a little time, such habits are apt to be lost, and the dogs to become of little value. The means of effecting these intentions of training in the best, most ready, and the easiest manner, is by having recourse to an old well-trained dog for the purpose, the habits and example of which the young dog, whatever the kind or uses of it may be, soon imitates and acquires, and thus becomes ready and properly prepared for the particular use for which it is designed. There are likewise some other points and circumstances in the training of these young dogs, which require to be well attended to and enforced by the person who has the charge of the business, such as the keeping them constantly well up to the particular practices and methods which are required in their different uses; the rendering them hardy and regular in the execution of their business of whatever nature it may be, and the making of them perfectly steady and tractable in the certain intention which they are to serve, with some others of less consequence. By steady exact management in these ways, and the occasional use of the whip, in certain cases, dogs may be well trained to almost every sort of field and domestic use.

ADVANTAGES AND USES.

Though many sorts of dogs may be made capable of assisting in conducting and managing herds and flocks by means of suitable training, yet the two first or a mixture of them are unquestionably the most proper and best suited to such purposes. Their cast of colour varies, being often quite black or bluish, with a circle of perfect white round the neck, the belly and feet white, and the face bald. There is a variety in the size of these sorts of dogs which admirably fits them in the smaller sort for the purposes of the flock-master, and in the larger for those of the herd-master and drover. The latter kind, which somewhat approach in size to that of the small sheep, are very strong, so that when their teeth are fully formed and made up, they are capable of seizing a sheep by the ear, and, on account of their strength and weight, keep it fast and safe without hurt-

ing it in the least; while the former, which has more activity, nimbleness, spirit, and perseverance, is not able to perform it, and is somewhat too keen and alert in particular practices of the shepherd. These sorts of cattle and sheep dogs prevail much in some southern districts of the kingdom, but are most commonly met with in the live-stock markets of large towns and cities. The thickness and length of the hair of the coats of these dogs is useful to them on many occasions, as affording an excellent protection against the severity of the season when they have to remain long near the person who has the care of the flock in such cases.

In some northern, elevated, hilly and mountain districts, as those ranges which extend from the north-west borders of Lancashire to those of Northumberland, there is also a small variety or sort of sheep-dog, which is in much use in the managing of the sheep flocks in many places. It has rather a lengthy body, but is short in the leg, and the coat is closely set with strong stiff hair. Some of these dogs in their colour are of a reddish brown, others black or black and white mixed; the face and neck parts having commonly some white about them. Some of these dogs, when well trained, are said, on good authority, to have the extraordinary sagacity of knowing the marks which distinguish their master's sheep, and of selecting and separating them from those of others, on the parts where the mountains are wholly inaccessible to the shepherd; a service for which they are probably better suited than larger dogs of the sheep kind.

In some other extensive sheep counties there is a very large sort of these kinds of dogs met with, which has great strength, and by proper breaking in and training is capable of acquiring the habits of great sagacity, discernment, and utility, in the management of sheep stock, especially in the feeding and other pastures, where they are liable to be injured by being cast in the furrows and hollows, as such trained dogs may be made to regularly pass through the different pasture-grounds, so as to take care to assist any of the sheep which may be in such situations, as is not unusual in hot seasons, in consequence of their weight of wool and their wide fat itchy backs, by putting their noses under the heads of the sheep, and gradually raising the fore-parts of them until they are capable themselves of getting upon their legs. But it is a good and useful practice in preventing the necessity of this, and the injury which the sheep sustain, to have proper rubbing contrivances in such grazing pastures, as is the case in some places, by which the severe itching on the backs of them may be relieved, and the sheep be thereby prevented from being overcast, as it is generally caused by the sheep endeavouring to roll upon their backs, and rub the parts by such means. In some cases, the sheep by being thus cast are almost instantly destroyed; and, where they continue in such states any length of time, they are very liable to have their eyes picked out while alive by the magpies, crows, ravens, and other such carnivorous birds. However, in other cases, they will often lie in such states for some time without sustaining any material injury or inconvenience.

The care, sagacity, or cunning in the management of these sorts of stock in these dogs is often very remarkable and extraordinary, as they will creep and keep slily out of the sight of them, except when they attempt to stray or get away from the body of the flock in any particular individual or case. By some storemasters, however, such dogs are often much

objected to and disapproved of, on account of their over activity in chasing and disturbing the sheep too greatly and unnecessarily, so as to cause them to be over-heated and become diseased; but there can be no sort of doubt that, in extensive flocks and in the larger irregular pastures of all kinds, they must not only be highly useful, but save the labour and expense of many persons, without the business being nearly so well executed, as the animals by their use become more tame and pacific as well as more readily managed in every way, but especially in the different folding practices. There is some advantage from the dogs themselves likewise, as they are in general annually clipped, and the produce thus afforded becomes serviceable for different purposes.

The guard and property, protecting and securing, sorts of dogs are not less useful and advantageous on many occasions than those of the shepherd kind, when well and fully trained and broken in for their several uses.

Section III.—*Diseases of Dogs.*

In the state of nature the dog is liable to many disorders, but still to a far greater number when domesticated and under the care of man. In the latter case they are also much more varied and less simple. Hence it requires a more exact and particular attention in the practitioner to investigate their nature, and to properly suit the remedies to them, as no knowledge of their particular states is to be had from the animal itself. The chief diseases and affections to which dogs are liable and exposed are those stated below.

They are like most other kinds of animals subject to febrile complaints of both the asthenic and sthenic sorts, as well as to most of the forms and varieties of disease that are to be met with in other cases and sorts of animals.

CATARRHAL AFFECTION or DISTEMPER.

This is by much the most frequent, as well as most fatal, of all the diseases which affect the dog. It usually destroys by far more than the whole of their other disorders put together, as but few young dogs escape its ravages: but it is a mistaken notion that it attacks young dogs alone; as of those which avoid having it while they are young, a very large proportion are seized with it at an after-period of their lives. It would indeed seem that no state or age is free from being affected with it, as it occurs in all conditions, and at almost every period of the existence of the dog, but much the most generally before the animal has attained its full and perfect growth, the more early however it happens, the greater the chance of its being removed and the dog restored. It is said to be more fatal to some kinds of dogs than others, as those of the greyhound sort than the shepherd kind, the former being usually destroyed by excessive bowel discharges. In its nature it is very contagious; but it is justly supposed that contagion is not always necessary to produce it, as on the contrary, any severe cold to which the dog may be exposed when immediately afterwards succeeded by the action of great heat, is capable of producing it; on which account it is very usual to take its rise from the dog's having been thrown into a river or pond in hot weather, or from being much exposed to and soaked with heavy cold rain or wetness with cold in any way in such warm seasons, and after coming to hot fires and other such situations. It is extremely various in the manner of its seizing the animals, as well as in the course of its progress, in some cases, beginning

by a sort of fits, and in others by large and frequent discharges from the bowels. Sometimes there are simply coughs; while at other times there is a wasting of the body, and in others again merely a moistness in the eyes, and running from the nose, without any other signs of the disease.

The appearances, however, which particularly mark its appearance and attack are those of moist eyes, with dullness, loss of flesh, slight cough, and some degree of sickness; after which a purging takes place, and the moisture in the eyes and from the nose takes on a more thick and purulent form, and there is often frequent sneezing, with weakness in the lumber parts. In this state, when the complaint is let remain without remedy, a paralysis of the whole body not unfrequently succeeds. In the course of the disease there are sometimes, too, a sort of fits presenting themselves, in which, when one speedily succeeds another, they display much danger of the recovery of the animal. Much destruction is often speedily caused by the fits, as well as by the largeness and continuance of the evacuations from the bowels; but in many cases there is only a gradual wasting in consequence of the mucous discharge from the nose and eyes, which is constantly attended with a high degree of fetor and nastiness.

Dissection in the different stages and states of the disorder has shewn decidedly that there is a general inflammation of the mucous or petuitary membrane lining the cavity of the nose and top of the throat, which, with the febrile state which is excited over the whole system, is probably the origin and foundation of the complaint and the source of all the other appearances, especially as the first signs of it are those of such an inflammatory state, and the most continued and constant indication of the disorder. And this is still farther confirmed by the inflammation in such cases being extended and continued from the linings of these parts to the higher portions of the windpipe, and from the upper part down some portion of the gullet, as is fully evinced by the swelling and soreness of the glandular parts of the throat, and the dry husky cough, which always takes place in such cases. It is shewn, too, that this inflammatory state is afterwards in some degree extended from these parts to the same sort of membranous lining of the stomach and intestinal canal, and may be productive of the vomiting, purging, or constipation, which so frequently occurs in such circumstances. This sort of distemper is peculiar in its generally attacking the weakest and most debilitated dogs, so that young, not well fed, enfeebled dogs are more ready in catching or being seized with it than old strong ones. It is likewise conceived by some that the catarrhal affection or distemper has tended to lessen the frequency of madness in dogs.

In the removal of this very inveterate and troublesome complaint, many different points and circumstances of the disease are to be well attended to and considered; when in cases where the bowels are unaffected and quite free from any sort of disturbance, and at the very first onset of the disease, great benefit may often be derived from such remedies as those directed below:

Take of—Antimonial powder, three or four grains,

Compound powder of contrajerva, ten grains; mix them into a powder, which may be given in the evening in a little fresh butter or some such substance, being repeated as there may be a necessity.

Or, at the same incipient stage of the disorder, the discharge of the contents of the stomach may be occasionally produced with great benefit by such means as these:

Take of—Solution of tartarized antimony, six drachms,

Wine of ipecacuanha, three drachms; mix and make them into an emetic drink, which may be given every two or three days in a little oatmeal gruel for two or three times, if the strength of the dog does not sink too much.

A strong solution of common salt in warm water, in the proportion of from one large table spoonful or one and a half to from three to five of the water, as the strength and size of the dog may be, will often answer the purpose perfectly well.

The bowels of the dog should at the same time be kept gently open without too much evacuation.

But where there is an excess of looseness, it must be instantly restrained by such means as these:

Take of—Compound powder of chalk, three drachms,
——————— ipecacuanha, one drachm,
Kino, in fine powder, half a drachm,
Syrup sufficient to make them into two balls, which may be given and repeated as there may be occasion; mild astringent food being had recourse to at the same time, such as flour or rice boiled in milk.

Where the discharges from the nose and eyes become very fetid and offensive, much advantage may sometimes be gained by means of such remedies as these:

Take of—Guaiacum gum-resin, in powder, two drachms,
Compound powder of ipecacuanha, one drachm,
Camomile flowers, in powder, one drachm and a half,
Compound tincture of benzoin, as much as is necessary for making them into two balls, which may be given once or twice in the day, as occasion may require, washing the parts well and frequently with a mixture of water in which carbonic acid gas abounds, and a little milk.

Sometimes, in these early states, submuriate of mercury in small doses and a mixture of turith mineral, in the proportion of four or five grains, and one of tartarized antimony, are found very serviceable, a little blood being previously let where necessary.

It is necessary to let the dogs have plenty of proper good food at all times in the course of the disease, except in the very early stage of its attack, while the active inflammation is present.

Besides these means, the distemper powder, so much celebrated and advised for this use, may be found of much advantage in some cases at the onset of the disease, and is to be had with proper directions for giving it in most places.

Where the dogs have much tightness and stoppage in the nasal parts, common tar and butter melted together, and put on and rubbed well upon the higher portions of them, are often of benefit in relieving them. And in cases of much distress and confusion with stupor in the head, utility is sometimes produced by the application of a blister or blistering ointment on the top part of it; but little service is produced from the insertion of setons in most of these cases.

After the first stages of the disease are over, recourse must be had to the more tonic and strengthening sort of remedies, such as the following:

Take of—Cinchona quilled bark, in fine powder, half an ounce,
Cascarilla bark, in powder, one drachm, Chamomile flowers, in powder, one drachm and a half; make them into a powder, which may be given in a little broth two or three times in the day as necessary.

The diet of the dogs should now be gradually rendered more full, with increasing larger proportions of animal matters and a plentiful supply of drink.

It has been well observed on the authority of much investigation and experience, that as this catarrhal disease is very commonly marked by the coming on of a state of considerable weakness at a very early period of its progress, the dogs should be exposed to the mild pure open air as much as possible, as the air which is taken into the lungs in breathing passes and repasses over the diseased parts of the lining that covers the inside of the nostrils as well as

the maxillary and frontal cavities, and must necessarily become loaded with and take off much noxious matter. They should likewise have fresh new milk and fresh made broth given them in a very frequent manner, and be allowed to go among grassy matters in order to induce them to pick up and eat some of them, as producing vomiting; and where possible, they should drink at running streams, as the contaminated mucous discharge from the nostrils usually drops into the water where they are drinking. Portions of raw flesh undressed are better than dressed animal food; and where there are evident appearances of the state of debility taking place, from five or six to ten, twelve, or more drops, as the size of the dog may be, of the tincture of opium may be taken every six hours with benefit. Where sloughs are discovered on the inside of the nostrils, they may be washed with a solution of the superacetate of lead or alum in soft water two or three times a day, by means of a syringe or flexible rod with a little sponge fastened to the end of it, the proportions of such substances being three or four drachms to a pint or more of the water.

These are the means which in general are found the most effectual in removing these sorts of affections in dogs.

INFLAMMATORY FEVER, CANINE RABIES, OR MADNESS.

It is very important, that the nature of this disease should be well understood, as it begins to be now either more noticed or more prevalent than formerly; but very little has yet been advanced, with any sort of correctness on the subject. There is scarcely any disorder usually supposed to be so well known and understood as this, yet on which there is so much ignorance and want of certainty; the cause of which is probably, in some measure, the unfrequency of the disorder, as in reality it occurs but seldom, and at distant periods of time; and also the particular characteristic appearances which mark the disease induced by the bite of a dog which is mad, in mankind, being equally supposed to exist in the dog, and caused the same name to be given to it, or that of *hydrophobia*. But which is clearly a dangerous mistake, and an improper term, as in no case has the dog been ever found to have the dread of water in any way, but, for the most part, to have a craving for it. This circumstance has, consequently, been the cause of much error and mischief, as it being the common notion, that no dog is mad which is capable of drinking water, many have been drawn into a mistaken security on that account. The supposition, too, that has so long generally prevailed, that the mad dog, in all cases must, of necessity, be highly wild and furious, is not less erroneous or mischievous, as in by much the greatest number of cases, there is but little of such wildness or savage furiousness as is commonly imagined to happen. In very few instances are the instinctive faculties of the dog either destroyed or disturbed. The tendency to be mischievous, where it exists at all, is probably rather the effect of the increase of the irritability of the animal than the loss of sense in it; as in almost all cases, even where they are inclined to be the most furious, they know the master's orders and are obedient to them. Some have supposed that this disease is caused by heat, or bad food, but in contradiction of which, it has been contended, on the ground of experience, that the complaint never arises from hot weather, or putrid provisions, nor from any other source than the bite of the rabid animal; as, however dogs have been confined, however fed, or whatever may have been the heat of the season, the disorder

never takes place without being capable of being traced to that cause. Consequently, it is rarely met with in the more northern parts of Turkey, still more rarely in the southern provinces of that hot tract of country; and is wholly unknown under the burning heat of Egypt. Nor was the disease ever known at Aleppo, where dogs perish in great numbers for want of water and food, and by the heat of the climate. In different other extremely hot parts of hot countries, dogs are never attacked with madness.

The canine rabies, or madness of the dog, has been distinguished into two kinds, the dumb and the raging, but the division is not in every case well marked; and the number of varieties in the disease are almost endless, so that the nature of the first appearances are difficult to be pointed out. By some it is said, that the beginning appearance is the loss of appetite; but this, by others, is by no means conceived to be the primary appearance in many cases, but a singular peculiarity in the manner of the dog altogether; something extraordinary in the conduct of the dog from that of its usual habits and customs, as it is a circumstance of such a peculiar and almost invariable nature, that it requires particular notice, as certainly, for the most part, marking the coming on of the disease. It not unfrequently consists in a strong tendency to catch up and at straws, bits of threads, or any such very small matters that may be on the floor, and this manner is intently persisted in until every such small matter is taken away. This is very usual, in the smaller sorts of dogs; but others again display it by licking the parts of other dogs, and in different other such ways. An inclination for the feeling of cold is usual in many instances, as shewn by the licking of unheated iron, stones, and other such cold substances. In some cases, it is not unusual for the dogs to eat their fæces, and lick up their urine, which strongly mark the coming on of the disease. There is often an almost invariable antipathy to other dogs, and especially to cats, displayed at an early period. The progress of this irritable state is frequently evident, their anger being first towards cats, then strange dogs, and, as the disease proceeds, they do not avoid the dogs to which they are accustomed, and, at last, the persons about them: but this is seldom or never the case, unless on the instant when the state of irritation is very strong. When they bite, this state is in a very high degree, but without any furious wildness, and is somewhat early in the complaint, being rather a sort of peevishness. With domestic dogs, in most cases, there is a similar gentleness, fondness, and obedience, visible in the first days of the disease; but by degrees they are mildly snapt at, or their feet are run at, as though in a sort of play; and they are not bitten, but the hand or the foot is taken into the mouth; but even in this state, the holding up a stick is sure to produce a high degree of anger and rage against even those to whom there is the most attachment. This is a very strong sign, and nearly a certain mark of the disease; yet, notwithstanding there is a remarkable impatience of control, and the dog is not easily frightened, nevertheless, in some cases, there is a mildness of disposition noticed throughout the whole disease.

In the dog affected with this disease, the disposition is generally extremely deceitful, as when called it comes, wags its tail, displays every sign of attachment, allows itself to be noticed and caressed, and is apparently fond of the care thus bestowed; but all on a sudden it turns and snaps or bites. Noise is not invariably made by dogs in this complaint; as some

have so much inflammation of the mouth and top of the throat, that the power of barking is wholly prevented. This is what is termed dumb madness, by some. But a noise is made in a very large proportion of cases of the disease, and which displays the most certain character of it giving the sign which is liable to vary the least of any. It is made by a peculiar sort of short howl and lengthy bark, which is so wholly dissimilar to any other noise, that whenever it is once heard, it can never again be mistaken. It is usually made by the head being held up in the air. There is a quick anxious look, with much appearance of distress in the countenance; constant redness in the eyes, which are often so inflamed as to have matter formed in them, and the power of seeing is occasionally deceptive, so that dogs snap at what they imagine they see. They have mostly a singular disposition to the carrying straw in their mouths, and the scratching of it up in lumps underneath them, which has been found to indicate a highly inflamed state of the bowels. Gnawing the different vessels and things about them, and destroying them, is nearly invariably the case with them. The desire of escaping, which, in many cases, is very great, is a very strong feature in the disease, and is not the consequence of pain or delirium, as commonly supposed, as when a dog has made its escape, it usually returns again, on being tired, except when in some way molested or destroyed. In these cases, the biting of animals is usual, but especially dogs, but man less frequently. The dog, in this state, is supposed not to go out of its way to bite, but this is only applicable to the latter stages of the disorder; as in the middle one, which is that when the mischievous tendency is the greatest, and while the animal has strength and activity, it is incessant in the pursuit of objects for the purpose. There is never, as has been seen, any kind of fear of or aversion to water; but, on the contrary, the high febrile state that is present renders the animals extremely thirsty, and they are frequently lapping fluids, yet occasionally without the power of swallowing them. The disease is, for the most part, attended with constipation, and there is commonly the appearance of pain and uneasiness in the whole or some part of the bowels. This inflamed state of these parts is the cause of their becoming paralytic, and faltering in the hind parts in many cases. And some have been seen from the same cause, to have a continual inclination to sit erect on the rump part of the body. The combined appearances of madness in the dog have been thus briefly stated: the animal at first looks dull, displays aversion to its food and company, has not the usual bark, but makes a sort of murmuring; it is peevish, and disposed to bite strangers; its ears and tail drop more than usual, and it appears drowsy; after this it begins to loll out its tongue, and to froth at the mouth, its eyes appearing heavy and watery: when not confined it soon sets off, runs along panting, with a dejected countenance, and aims to bite any one it may meet. When such mad dogs escape being killed, they rarely run more than two or three days, when they die worn out and exhausted by heat, hunger, and disease. By some a distinction is made in the symptoms between dumb and raging madness in dogs; as, in the former, the nether jaw drops and is fixed, the tongue hangs out of the mouth, and slaver drops from it; while, in the latter, the mouth is shut, except when the dog snaps or howls, and no moisture drops from it.

Numerous dissections, in different stages of the disorder, and under the several varieties of it, have shown some appearances to be the

same in all: as for example; in every case there is inflammation of the stomach and bowels, as well as of the lungs, in a larger or smaller degree, but without their being in any way in equal states of it. In cases where there are great restlessness, quickness of look, excessive panting, and much inclination to commit mischief, with an almost unceasing barking noise, the inflammation in the last of the above parts is found to be extremely high; while the bowels are less in that state, but never wholly free from it. Where there is more mildness, and the animal seems affected in the loins, where it eats greedily of straw or dirt, and such kinds of matters, and often throws up what it has taken, it will be found, on examination, that the stomach and bowels are chiefly affected with inflammation. In the state which is denominated dumb madness, the stomach and bowels still suffer most; but there is the addition of the mouth and throat being peculiarly affected. In some cases the latter alone is affected, causing a difficulty of swallowing, and a singular deep sort of choaking noise; while in others the whole of the mouth is affected, the tongue is inflamed to the end, and nearly black. There is a dropping of the jaw, and slaver comes plentifully from the mouth, and there seems to be nearly a complete paralysis of that part. In this state or variety of the disorder, there is rarely any highly mischievous disposition displayed; but there is often full as much mildness and tractability as at any other period, without shewing any inclination to bite during the whole time. In cases of this sort, on examination after death, there is no sort of change shewn in the parts of the mouth and throat, but a trifling increase of vascular appearance. In the wild kind or variety of the complaint, the vessels of the brain have a very small degree of redness; and very generally the stomach is found filled with different unusual matters. The time which the complaint lasts is rather various; but it rarely proves fatal sooner than the third day, and few hold out over the seventh, the greatest number have their fatal termination on the fourth or fifth from the first attack.

In respect to the prevention and removal of the disease, almost all the famed nostrums and means that have been hitherto tried have failed, and proved ineffectual for the purpose; and the latest, perhaps, which has been proposed, and its success supposed so certain in preventing the complaint, will, in all probability, from the nature of its composition, share the same fate. It is said to be constituted of the fresh leaves of the tree-box, and the same of rue, in the proportion of each two ounces, with half an ounce of sage leaves; the whole being finely chopped, and boiled in a pint of water to one half, then carefully strained, and the liquid strongly squeezed out. The dregs are then to be put back into a pint of milk, and further boiled to half a pint, being strained as before, when both liquors are to be mixed together, which constitutes three draughts for a man; double the quantity for a horse, cow, or other such large animals; two-thirds for a large dog, one half for those of a middling size, and one third for a small dog. Three doses are considered as sufficient, when given each succeeding morning while fasting; which is the quantity here directed. It is noticed, that as it sometimes produces very powerful effects on dogs, it may be best to begin with a small dose, but it is conceived constantly necessary to increase it, until its action and effects become quite evident by the sickness, panting, and uneasiness, produced in the dogs. In giving it to the human subject, no unpleasant or active effects have ever been witnessed from it.

The only perfectly safe and effectual means of preventing the disease, however unpleasant, is, unquestionably, that of the instant complete extirpation of the part, for neither the actual cautery nor the caustic are perhaps to be fully depended on.

HIGH FEVER WITH INFLAMMATION OF THE LUNGS.

In this disease, which is not unusual among dogs, there is a considerable state of strong fever, with some degree of fixed local inflammation in the lungs, as the nature of the cause may be. In some circumstances, too, it is epidemical, taking off very great numbers of dogs. It is commonly caused by cold, and the sudden stimulus or action of heat afterwards. It makes its attack in rather a sudden and rapid manner, by much feverish heat and pain in some part of the lungs, and, for the most part, where not removed, terminates fatally on or about the third day; often by much effusion of water into the chest, and consequent suffocation. It displays but little variety in its appearances, seizing the whole in much the same manner, and generally terminating somewhat similarly in all. Its presence is denoted by a feverishness, with much pain in the side, restlessness, and a peculiar anxious look of countenance.

When taken in its onset, which is rarely the case, in the cure, benefit may be derived from bleeding in such full proportions as may be suitable and necessary, which may be from a few ounces to eight, ten, or more, in proportion to the size and strength of the dogs; but after this first attack, and the elapse of a day or two, it must not be ventured on, as it commonly proves the almost immediate destruction of the dog. With the bleeding, the use of blisters to the sides of the chest may be combined; and it may be useful for the animal to lap plentifully of mucilaginous oily fluids, mixed with a little milk, frequently in the day.

STRONG FEVER WITH INFLAMMATION OF THE BOWELS.

This is a rather common disease in dogs, as arising from constipation, exposure to cold, and various poisonous substances taken into the stomach. It is attended with strong fever and local affection of some part or the whole of the intestines.

The appearances, where the disease is occasioned by the first of the above causes, are the slow progress of the disease; there being no very acute pain in the parts locally affected, but a want of evacuations; and the vomiting up the food that has been taken, although it may have been eaten with seeming appetite. But when the inflammation and fever are considered as arising from the second of such causes, they are marked by a violent panting, a complete rejection of food, and continual sickness. There is likewise great heat and pain in the belly, which are attended with much weakness, and the eyes are much tinged with redness. And where the disease proceeds from the last of such causes, there is a constant sickness; the nose, paws, and ears of the dog are cold, and a frequent discharge of brownish or bloody evacuations takes place.

In the cure in the first of these states of the disease, the chief intention to be aimed at is the removal of the costive state of the body, which may probably be best effected by strong purgative clysters of the more active kind, with the use of the warm bath. After which, the body may be kept well open by the submuriate of mercury in combination with some of the aloetic preparations. These different remedies may be formed in this manner:

Take of—Sulphate of magnesia, half an ounce, dissolve it in the

Compound decoction of mallow, six ounces,

Olive oil, one ounce; mix and make them into a clyster, which may be thrown up into the bowels as necessary.

Take of—Purified extract of aloes, grains ten,

Submuriate of mercury, grains four,

Syrup of buckthorn, as much as is necessary to form them into a ball, which may be given as there may be occasion.

In the second of such states of the disorder, the belly should be opened by the use of mild clysters, such as the oil of castor in the quantity of an ounce or more, and be kept in that state; but strong purges, such as the above, should be carefully avoided. Then the warm bath may be had recourse to, and afterwards blistering substances be applied to the belly where most pained, which often afford relief.

In the last of such states, trials for the relief of the animal may be made by first causing vomiting, then giving castor oil, and throwing up oily clysters or fat mutton broth ones frequently into the bowels; but even such means often fail of success.

WORMS.

The dog is an animal which experiences much uneasiness and distress from the worms, and which in it, as in most other cases, they are of different kinds, though the consequences which they produce have much similarity.

The appearances where they prevail in them are that the coat for the most part stares; the appetite is greedy and ravenous, yet the animal rarely thrives well; the breath has a fetid smell; and the stools are without regularity, being sometimes loose and slimy, while at others they are hard and dry. But the worms in these animals have occasionally a still worse effect; they produce fits and sometimes a continued state of convulsion, in which the dog after lingering for some time is destroyed. These fits are at times of the more violent cast, while in other cases they display a more simple, tame, and dull nature, there being a loss of sense and a constant turning round in the animal.

In the removal of the complaint while the animal is in this condition, the use of the warm bath may be beneficial with opiates in proper quantities, according to the state of the dog, and strong cathartic purgatives of the calomel and powdered jalap kind, so as to destroy, expel, and obviate the return of the disease.

The following is found to be sometimes useful in destroying the worms in these animals:

Take of—Subcarbonate of ammonia, four grains,

Sublimed sulphur, half a drachm,

Purified extract of aloes, eight grains,

Juice of wormwood, as much as is sufficient to form them into a mass, of which a small piece, the bigness of about a common nut, may be given every two or three days, mixed with any convenient substance, the dog being left unfed for a little time afterwards. Eight or ten grains of Indian pink root may sometimes be added to the above with good effect.

A powder, composed of pewter in fine powder, the black sulphuret of mercury, and powdered jalap, in the proportion of about half a drachm of the first, a scruple of the second, and ten grains of the last, has been advised to be given two or three times a day, resting a day or two between each, and keeping the animal warm and free from cold water. In a little while afterwards pot-liquor or whey may be given to it, and be continued in the place of solid food while it is taking the powder. This is most conveniently given in a little butter by being made with a little flour into small balls.

The proper way of giving balls and pills to dogs is to draw the tongue out by the hand, and then thrust the ball or pill down the throat as far as possible, as then by the drawing in of the tongue they will be let slip down without any possibility of hindering them.

For the purpose of making dogs fine in their coats an ointment or dressing composed of one pound of sublimed sulphur, two pounds of soft

soap, one pint and a half of neat's foot oil, and half a pint of oil of turpentine, may be used three or four times in the year, by which their skins will be kept perfectly clean and free from filth and look fine and glossy.

AFFECTIONS OF THE GRIPE AND COLICK KIND.

There is in dogs different kinds of these complaints, as those arising from constipated states of the bowels and those proceeding from a painful spasmodic state of them, to which they seem peculiarly liable and exposed. In cases where there are sudden and much exposition to severe cold, dogs are liable to be all at once seized with paralysis, especially in the hind parts of them, in which there is great pain and tenderness in the feel, having, in some measure, the signs of an affection of the loins; and in which there is constantly some particular disordered state of the intestines, as sometimes great costiveness and invariably much pain. Here in the cure the warm bath will be necessary with the more powerful opening remedies, in order to remove the colicky state, and external stimulant and discutient means be useful in taking away the local paralytic affection, and in some degree that of the loins. Though the colick which proceeds from constipation is not usually very severe in the pain which it gives, yet occasionally there is evidently more spasmodic affection than directly depends on the restricted state of the intestines. In the first of these states the submuriate of mercury, in combination with the purified extract of aloes, and oily clysters, will be beneficial; and in the latter, ether with opium and castor oil will commonly prove greatly useful.

ACUTE AND CHRONIC COUGHS.

The former of these states of cough is an usual attendant of what is commonly termed distemper in dogs; but the latter is an affection of the local or chronic kind in some part of the chest of the dog.

In the cure, the first may be relieved in the manner directed under the head distemper; and the latter may be rendered more mild and easy by the use of blisters as near to the affected parts as possible, and of balls composed of gum ammoniacum, benzoin, calomel, and opium, in the proportion of eight or ten grains of the two first, two grains of the calomel, and half a grain or a grain of the last, given once or twice daily, with plenty of greasy broths as drink. In speaking of local affections of the lungs or canine asthma below, the manner of treating this state of disease will be more fully considered.

LOCAL AFFECTION OF THE LUNGS OR CANINE ASTHMA.

There are some dogs which are very liable to an affection of these parts, and which has much the appearance of that in the human kind which is denominated asthma; but there is this remarkable distinguishing difference, that, that attacks generally, at all periods of life, and under all circumstances; while this is solely confined to old dogs or such as have been closely kept up, too fully fed, and which want exercise, by which they may be supposed to become in a disposed habit to the disorder. The cause of the affection in some instances may be traced to severe cold; but even in these the peculiar disposition has been already laid by the effects of confinement or by the dog being in too fat a condition, which last is so certain to induce the disease, that it is scarcely possible to have a dog possessed of much fatness for any considerable length of time without causing it to come on.

Dogs, in most cases, which are from four or

five to six or seven years of age, when much kept up in the house, or confined much in any way, become disturbed and harassed with a short dry tedious husky cough, which takes its rise very gradually at first, and an endeavour to bring up some sort of substance, which by degrees becomes more constant until ultimately almost incesssant; giving cause to an arid sounding cough, attended with moist eyes and constant efforts to get up small portions of frothy mucus, which afford instant relief, but the cough speedily returns after continuing in this manner for more or less time; but in certain circumstances, sometimes for years the animal is at times seized with fits, from the joint effects of both which it is destroyed either by suffocation or from being exhausted.

As this canine asthmatical cough is not seldom mistaken for that which takes place previous to or attends the catarrhal affection or distemper, it may easily be known from that by the age of the dog, by its not injuring the health generally, by not causing sudden wasting, and by its not giving way so speedily to remedial means.

In the cure of the complaint there is frequently more difficulty on account of its being long unknown and neglected, so as to become habitual and inveterate. It is necessary, therefore, in the first place to attend well to the habits and management of the dogs, as where there is over-warmth or over-feeding, such customs must be constantly and regularly obviated. When there is too high a state of fatness, the exercise must be such as to reduce it, as not too severe or too quick, but gentle and of some length of continuance. The food should be chiefly of the vegetable pot-liquor kinds, and moderate in quantity; and there should be a full and free circulation of air without the animal being too much exposed to the cold or currents of it. The remedies should be of such kinds as those below:

Take of—Tartarized antimony, one grain and a half,
Submuriate of mercury, three grains and a half,
Root of ipecacuanha, in powder, six grains,
Treacle sufficient to make them into a ball, which may be given to a middling sized dog, so as to excite nausea or vomiting, every third day with much relief and advantage. And in the intervals the following may be had recourse to with propriety and benefit:

Take of—Opium in the lump, one grain and a half,
Submuriate of mercury, two grains,
Ammoniacum gum-resin, in powder, half a drachm,
Copaiba, as much as is necessary to make them into a bolus, to be used as above.

CONVULSIVE AND SPASMODIC FITS.

There is a particular disposition in dogs to the taking of fits, which in them arise from many different causes. They are often attacked with those of the convulsive kind, in the diseased state termed distemper.

In this case they come on by a sort of chewing or champing of the jaws and a shaking of the head, which by degrees extends over the whole of the animal.

In dogs worms, too, are often the cause of fits of the irritating spasmodic kind, which sometimes completely take away the sense of the animals, they running wildly about until they become worn out, when they recover by degrees, and probably have not another fit for some time. Being too much confined has also the same effect in producing such fits, as well as that of being too much constipated or confined in the body.

In the cure in the first sort of these cases, strong emetic remedies have been found useful sometimes in checking the advance of the disease, but they rarely altogether remove it, as it has very commonly a fatal termination.

In the latter sort of affections of this nature, immersing the dog in cold water has usually the effect of obviating and remedying the im-

mediate attack of the fit, when recourse may be had to a bolus of the following kind:

Take of—Sulphate of zinc, in powder, two grains and a half,
Opium, two grains,
Castor, in powder, ten grains,
Peruvian balsam, as much as is proper for making them into a ball, which may be given once a day, or every other day while necessary.

SCHIRROUS HARDNESSES AND ULCERATIONS.

Dogs are occasionally subject to these sorts of complaints, though free from those of the actual cancer kind. In the bitch there is in the teats sometimes a large swelling of this nature, and occasionally in the testes of the dog, that in some cases takes on ulceration. In the former, when not allowed to breed, the milk, which is formed without her being impregnated, in a little time coagulates in such parts, causing much irritation, which by degrees becomes a swelling of the schirrous kind, increasing in some cases to a large size and weight. On the surface there are sometimes ulcers forming, which increase in a gradual manner, but without seeming much to distress or injure the health of the animal.

In the more early stages of the first of these cases, benefit may be derived from discutient applications formed by means of vinegar and spirit of camphor, with salt; and the weak blistering liniment, with mercurial ointment and a little camphor rubbed upon the parts without causing the irritation of blistering, has in some cases been attended with success. When the swelling becomes separated from the cellular substance of the belly and hangs low in the skin, it is advised to be cut away, and its return prevented by permitting the bitch to breed. Internally calomel, in small doses, as an alterative, may be useful.

In the case of schirrous testes nothing has been found to answer but the removal of the parts before the spermatic vessels are much diseased.

SCROPHULOUS OPHTHALMIA OR SORE EYES.

Sore eyes, without terminating in complete blindness, are not unusual in dogs. In it the eye-lids are somewhat similarly affected to that of the scrophulous affection of the same parts in the human subject. The ball of the eye is also in some cases found to be dropsical.

In the cure of the first of these cases submuriate of mercury in slight doses may be given internally, and an ointment made very fine and soft, of the ointment of nitrate of mercury, calamine cerate, and prepared lard, be used in a light manner to the parts.

In the last, the submuriate of mercury, with powdered squill, may be tried in small doses, and the local application of some properly stimulant liquid over the eye-lids, may be found beneficial in removing the disease of the parts.

BLINDNESS.

There are many affections in the eyes of dogs, some of which terminate in perfect blindness. There is occasionally, in the case of distemper, a small sort of abscess forming directly on the pupil of the eye, which on some occasions gets so large as to let out the whole of the included parts of the globe of it, when blindness is inevitable; but it often heals, bearing simply a dark spot, which mostly soon disappears.

There is also blindness arising from an opakeness in the inner part of the eye within the pupil. Old dogs in general have opacities of this nature, the bottoms of the eyes becoming milky and dark, yet the lense part is neither hardened or wholly white.

In the former of these cases regard is to be chiefly had to the diseased state, washing it well with a weak wash of the diluted solution

of subacetate of lead, with an equal quantity of rose water.

The latter case is probably altogether incapable of being either cured or prevented.

SCAB OR MANGE.

This is a scabby affection of the skin which is very common in dogs, arising from contagion or produced by nastiness in them, but which is less infectious than is commonly believed. Some dogs are more disposed to it than others, as those which are white and those which have strong wiry hair. It varies in some measure, as by having a general red scabby sort of eruption over all parts of the body, with much acrimony and stubbornness, being frequent in the large sort of terriers; and by having a scabby mangy breaking out in the blotchy manner along the neck and back, which is more highly contagious, and most common in Newfoundland dogs and terriers. It varies, too, by appearing with a simple redness and intolerable itching in the skin, being the most usual in white terriers and white dogs in general. There is a sort likewise which affects the claws and toes of dogs; and that which appears in the manner of a sort of canker in the ear, and on the flap of it, is a sort of it which belongs to this disease.

In the removal or cure of these states of the disease it is necessary to prepare the way by beginning with the removal of every kind of dirt, filth, and nastiness from the skin of the animal, by washing it well with soft soap and warm water, the nourishment being improved by better keep; and the indirect weakness, sometimes induced by too high keep, obviated by lowering it. Then some persons advise, where there is much heat and itching, to have recourse to bleeding and purging; but these seem generally unnecessary, from the local nature of the disease in the skin. Mild mercurial remedies, or sublimed sulphur, given internally, and proper external applications, may commonly be quite sufficient for the purpose without such means. For applying to the spots, as they may break out, the following oily mixture may frequently be useful:

Take of—Train oil, half a pint,
Oil of turpentine, a gill,
White hellebore root, in powder, two ounces,
Gunpowder, powdered fine, two drachms; mix them together in the cold state for use as above.

In cases where the disease is become more inveterate, an ointment, such as that below, in suitable proportion, may be rubbed well on the affected parts once or twice a day:

Take of—Compound sulphur ointment, half a pound,
Strong mercurial ointment, two drachms and a half
Zinc ointment, half an ounce; mix them well together with a little common oil, so as to make them into a soft ointment, to be used as mentioned above, sublimed sulphur being at the same time given internally.

Where the mange is of the red kind, such an application as the following, rubbed in daily, on the affected parts, and where the hair is off or any redness is seen, in a full quantity, for three or four days in succession, may be more useful than the above; first having the animal well washed with a solution of salt and soft soap in warm water, and letting the dog become quite dry before it is rubbed on, also giving a little sublimed sulphur in warm milk or pot-liquor at the same time:

Take of—Tar ointment, half a pound,
Strong mercurial ointment, two ounces,
Sublimed sulphur, four ounces,
Liniment of verdigris, three drachms,
Venetian turpentine, two ounces and a half; mix and rub them well together with oil until they form a sort of ointment for use in the above manner.

And in the cases where the ears, claws, and toes, of dogs are affected, benefit may often be gained by the application of the following substance once or twice in the day, to the parts in small quantities, previously washing them well in the manner that has been directed.

Take of—Liniment of verdigris, two ounces,
Zinc ointment, one ounce,
Oil of turpentine, one ounce; mix them into a thin liniment for being applied as above.

By these different sorts of means, this nasty troublesome affection of the skin in dogs, may generally be removed without much difficulty or inconvenience.

WORMING.

This is a practice which has ignorantly been supposed, from a very early period, to have the power of preventing one of the most unpleasant and fatal diseases of dogs, that of canine rabies, or madness; but which cannot possibly, from its nature and circumstances, have any such effect. It is simply this, that the small ligamentous cord under the tongue of the dog be taken wholly out, which has some distant resemblance to the common earth worm; and the manner of performing it, which is when the dog is very young, or a whelp, is by slitting, with a sharp instrument, the thin portion of skin that directly covers it, and then, with a sort of small awl put under it in the middle part, raising it up and drawing it wholly out. The operation can, of course, be of no sort of practical utility, as only taking away a part that has unquestionably its office in the economy of the dog, the mouth and tongue of which have so much to perform in different ways.

SECTION IV.—*Uses and Purposes to which the several Parts of the Dog are appropriated and applied.*

THERE are several different parts of dogs which are found useful in many ways, and for different distinct purposes.

FLESH.

This is of but little value in this country, as the flesh of the dog is not considered as proper for use as food; but on the American continent, and in some other parts of the world, this sort of flesh is said to be eaten, and to be found common in the markets, with other sorts of animal food and game. In some of the South-Sea Islands they are fed and fattened, where they will not eat sufficiently in a voluntary manner, with vegetables, by cramming them down their throats, in the way in which the turkey is crammed in this country. When thus prepared, they are killed by means of strangulation, and the collected extravasated blood preserved and baked for the table. Young and fat dogs, especially those which had been emasculated, were considered by the ancients as excellent food, and held in high estimation. But though there can be no doubt that the flesh and blood of the dog are very good as food; from habit and prejudice they can here only be made use of as manure, in mixture with earthy substances, for which they are valuable, and never to be lost or thrown away, as is much too commonly the case, and the effect, in many instances, very hurtful and disgusting. The fat may be found useful for some purposes in the arts and manufactures.

SMALL GUTS.

These may probably be formed into small strings for different uses, as they are remarkably tough and fine in their nature, and may be advantageously applied to several fine purposes.

HAIR.

The hairy coat of the dog is capable of being made use of for many purposes, where the softer sorts of hair are wanted, as those of stuffing cushions, seats, and other such uses, as well as for forming coarse hats, in some cases.

SKIN.

In many cases, the skin of the dog forms a tough, close, and most excellent sort of leather,

for all the finer sorts of shoes, and which must be of great use wherever such qualities of leather are wanted. Perhaps the skin of no animal forms so close and lasting a leather as that of the dog. The skins of large dogs should, therefore, be more carefully preserved and converted to this use than is commonly the case.

DUNG.

The hard dung of the dog is often much collected, and employed in different processes in large towns, as those of tanning, dyeing, and some others; and that of all sorts is very useful as a manure, and, with care, where a number of dogs are kept, might be raised in considerable quantities to what is usually the case.

These are most of the parts which are necessary to be attended to in the dog, as productive of much utility and advantage.

Chapter XI.—LIVE STOCK.

POULTRY.

Section I.—*Nature, Qualities, distinguishing Particulars, Rise and Uses, in the different Kinds.*

Under the head Poultry, it will be necessary to consider a great number of different sorts of domestic birds and fowls, both of the aquatic, the large granivorous, and the gallinaceous kinds; as each of these several classes have many birds which become extremely useful and valuable as food, and which are raised in large quantities for the purpose of the table, as supplying a portion of the finer kind of the flesh-meat which is consumed to so very great an extent in this country: but it is not improbable, that they may be reared and provided in some other countries, where the climates are more warm and dry, in a still much larger proportion, as the soils which are the most dry and warm are every where the most suitable and favourable for the purpose, especially in a great many of the sorts. It has, however, been supposed, but without any sufficient or satisfactory grounds, that here, formerly, under the system of little farms, more poultry was produced than is the case at present; but the contrary is most probably the fact, as the price of it has neither exceeded the proportion of that of other sorts of food, nor the demand for it been less abundantly supplied, while the population of the country, and the luxury of living, have been very greatly increased. Nay, the circumstance of the vast increase in the growth of grain, which is so essential in the breeding and raising of such stock, of itself strongly contradicts any such supposition. As, however, but little profit attaches to the producing of it in almost any circumstances of the farmer, it is not to be wondered at, that more attention is paid to other more important articles of cultivation, where the trouble is less, and the advantages greater and more certain, whatever may be the nature or extent of the farm, as they must be the most beneficial to himself, and, in all probability, also to the community at large. Notwithstanding, in situations near large towns, where particular care and attention can alone be paid to the rearing, feeding, and managing of such sorts of stock, there can be little doubt but that considerable profit and ad-

vantage may often be derived from the practice of raising, keeping, and fattening poultry for the market.

In the first, or aquatic, class of poultry, there are varieties in the size, as well as in the nature and quality of the food which they afford; but in all the flesh is of the more savoury stimulant kind, which is highly nutritious where the stomach is in the healthy proper state. They have all the habit of being strongly attached to the water, and of living partly in it, without which they cannot be produced in the best manner, or to the most advantage and profit.

Naturalists mark and distinguish this class of birds by the shape and nature of the bill and tongue; the former being convex and obtuse, with the edges of each of the mandibles beset with lamellated teeth; and the latter ciliated and obtuse; the first is also strong, broad, depressed, and mostly furnished at the end with an additional piece or nail; nostrils small and oval; the last broad near the base, and fringed at the edges; feet webbed; toes four in number, three being placed before and one behind, and the middle one longest. In the swan and the goose, the upper mandible is somewhat more convex or rounded than in the duck, in which it is commonly more flat. And in the swan-goose, there is the difference of more uprightness in the gait, and the having a large knob on the root of the upper mandible, with mostly a skin, nearly bare of feathers, hanging down in the manner of a pouch or wattle under the throat.

APPELLATIVES, OR USUAL NAMES.

In the swan kind, the different sexes, when in the full-grown state, are termed *male* or *female* swans; and the young produce of them, until they are become full grown, *cygnets*, or *young swans* as their age may be less or more advanced.

In the goose kind, the grown male is called a *gander*, or *steg*, and the grown female, a *goose*; and the young produce, *gulls* and *goslings*, as their age advances.

In the duck kind, the grown male has the name of *drake* and *mallard*; the grown female that of *duck*; and the young produce are denominated *ducklings* or *young ducks*, as their age increases.

ORIGIN OF THE DIFFERENT KINDS.

It would seem most probable, that the swan, in the more tamed state, originated from the wild sort, as a very distinguished naturalist has long since supposed, and which is certainly the most conformable to analogy; but a different opinion is entertained by others, in consequence of a material difference existing in the structure and distribution of the *trachea* of the wild from that of the tame sort. If this be really the case in the wild bird, in all situations and countries, it will be very difficult to trace the source from whence the domesticated breed have been derived, as there is no other sort of known bird which has any general similarity whatever to it.

In the tamed or domestic goose and the duck kinds, the origin is evidently and satisfactorily drawn from their respective wild kinds, of which they still retain something of the economy and habits.

In the second or large granivorous class of domestic poultry there is still greater varieties in the size than in those of the first sort, and the flesh or food which they afford is equally various, being in some of a fine white delicate colour, approaching to that of the young common fowl, but in others of a darker cast, with more of the game flavour. However, in almost all, it is of a very excellent nourishing quality; and, in some, of rather a light and easily digesting kind. They are all disposed to the

use of grain as their chief food when grown, without which they cannot, probably, be brought to their perfect state.

Naturalists distinguish and characterize this class of birds by their having stout, but not long, bills; by the cheek parts being covered with a skin which is smooth and naked; and by the legs having, in general, spurs; to which, in the bustard or first sort of these birds, it may be added, that the bill is subconvex; the nostrils oval and pervious; the tongue bifid and pointed; the feet formed for running, three-toed, and the legs tall and naked below the thighs; no hind toe, but the nails short, strong and convex both above and below: that in the second, or turkey, the bill is convex and strong but short; the legs very stout, and of moderate length; the anterior portion of the head, and also the sides of it and the throat, are strangely covered and ornamented with a pendulous, soft, fleshy substance; the nostrils not large; and the eyes small and bright: that in the third, or peacock, there is a convex robust bill; the head is covered with feathers turned back; the nostrils are large; the feathers of the rump being broad, expansive, and covered with rich eye-like spots: that in the fourth, or pheasant, the bill is of a pale horn colour, and the nostrils are hid under an arched covering: and that in the last, or guinea-fowl, the head is naked of feathers, and covered with a clear skin of a bluish cast; on the top is a callous protuberance of a conical form; at the base of the upper mandible on each side hangs a loose wattle, in the female red, but in the male bluish; the bill rather strong; and the nostrils not very small.

APPELLATIVES, OR USUAL NAMES.

In the tame bustard kind, the full-grown male bird, is called a *cock* or *male*, and the female a *hen* or *female;* the young produce of them are termed young *male* or *female* bustards.

In the domesticated turkey kind, the grown male is named a *cock*, and the female a *hen turkey;* the young produce having the names of *young turkeys* and *turkey poults*, as they may have advanced in their growth.

In the tamed birds of the pea-fowl kind, the grown male has the term *peacock* applied to it, and the female that of *peahen;* and the young produce are named *young pea-fowls* and *peafows*, as they may be of less age or more fully grown.

In the pheasant kind, the male bird has the name of *cock*, and the female that of *hen pheasant* given to them; and the young produce have the names of *young cock* and *hen pheasants*, as their kind may be.

In the guinea-hen kind, the grown male bird is called a *cock*, and the female a *hen guinea-fowl;* the young of them *young cock* and *hen guinea-fowls*, and when grown *guinea-fowls*.

ORIGIN OF THE SEVERAL KINDS.

The origin of the birds of the first of these kinds which are in the somewhat tamed state has been evidently from those of the wild sort which were once in great plenty in many parts of the country, but which are now rarely to be met with, and confined to a very few of the more open parts of it.

The turkey, in the tamed state, originated almost without doubt from the wild sort of the American continent, as these birds were found there in the wild as well as the domestic state; the former being considerably larger than the latter, having generally a black colour, variously-tinged with those of bronze and fine glossy green, which, in some parts change to a sort of purple. It is a bird which was, most probably, introduced into this country from Spain, after the discovery of the above conti.

nent, and still later into some other parts of Europe.

The birds of the peacock kind, in the domesticated condition, are believed to be natives of India, and to have had their origin in those of the wild sort, in which state they are still found in the islands of Ceylon and Java, as well as in many other parts of Asia, as near the Ganges, where they are the largest in size, and of the finest kind. They are also found wild in Africa.

The pheasant kinds of these birds are, most probably, the original production of the East, having been supposed to have been first found in their perfectly wild state on the margin of the *Phasis*, from which their name is perhaps taken, and from which they have been introduced into this and other parts of the world.

The last of these kinds of birds, in the tame state, have had their origin in those of the wild sort, of which there are said to be plenty in Guinea, their native situation, as well as in America, in which places they perch on trees; and, in their wild condition, form their nests in holes of the palm-tree. They are not unfrequently found collected in large flocks.

In regard to the last class or division of the poultry kind, there is less difference in the size in the birds of it than in either of the other sorts; yet they vary in some considerable degree in many of the kinds. The flesh or food which they supply is, in general, of the more delicate white colour, with a highly agreeable flavour and light nutritious quality, being easily digested in most cases, even by the stomach of the sick person. These, like the former, as partaking of their nature, are all in the habit of principally feeding on corn, and are probably not capable of being raised to perfection without it.

Naturalists distinguish this class of birds by their having the bill short and strong; the cheeks covered with a smooth naked skin; the legs generally with spurs. The male birds have a comb on the crown of the head, and two wattles on the chin compressed; in the female, the former are small or none; ears naked; tail compressed, erect.

APPELLATIVES, OR USUAL NAMES.

In the domesticated hen kinds, the grown male is termed a *cock*, and the female a *hen;* and the young produce, or broods, *chicks, chickings, pullets,* and *fowls,* as they are of different ages or growths.

ORIGIN.

Though there are no traces whatever of the original domestication of these birds now existing, there can be little doubt of their being found in the wild state in the woods and other such places in the East, from whence the almost endless sorts and varieties of the tamed kinds have been very generally spread, and introduced into nearly every part of the habitable globe. It is not, however, improbable that the jungle cock of the above country, which has the plumage of so many fine colours, and on the back part of the head a fleshy kind of substance of a squarish form and blood-red colour, with a thick and strong bill, the breast of a beautiful mottled red and green, and the tail, consisting of twelve large fine showy feathers, may have given rise to some of the sorts, as being easily tamed, and having a double comb on the head, with a wattle of some length hanging below the under mandible, and the beak and legs yellow in their colour.

SECTION II.—*Houses, Yards, and other Conveniences, proper for raising and keeping all Sorts of Poultry in the best Manner and to the most Advantage and Profit.*

BEFORE describing the different birds of the

poultry kind, and considering the methods of breeding, rearing, feeding, keeping, and managing, the several sorts of them, it will be necessary to point out the most proper, convenient, and useful houses and contrivances for the purpose. Under a regular and extensive system of this kind, in the view of security, and as the nature and habits of the different classes or sorts of such birds are very different, it would certainly be the most beneficial and convenient to have the whole connected, but at the same time so divided in the parts as to have separate necessary divisions and conveniences for containing and raising the different kinds, the aquatic sort being so arranged as to have the advantage of ponds or pieces of water adjoining them where possible. By such means the least trouble and difficulty would arise in the raising of such kinds of stock, and the greatest economy, protection, and success, in keeping them be produced. The small, cold, wet, dirty, exposed, houses which are usually employed for this purpose are highly improper, and attended with many disadvantages in the providing and keeping almost every sort of poultry. As warmth and dryness are found so essential in the early laying, hatching, and raising, the young of most sorts of poultry, it is proper also that such houses, in order to be the most advantageous, should have the means of being conveniently provided with heat in a suitable manner, as the cold of the different seasons may render the want of it necessary. Hitherto, however, but little has been done in this way, except by building such houses in some cases, so as to join those which have fires generally, frequently, or regularly, kept in them, by which some slight degree of warmth may be communicated. It is not improbable, however, that a regular, proper, graduated, heat and warmth might easily be produced and preserved in them when necessary without much expense or trouble, by having recourse to suitable low walls at the backs of the divided parts where the poultry lay, produce their young broods and are kept, properly flued, somewhat in the manner of those used for raising some of the finer sorts of wall-fruit, and having them heated by suitable stoves for the purpose. In this manner heat is capable of being provided, regulated, and conveyed, in a sufficiently extensive degree with much certainty, and great facility in the management, so as to be applicable to such an use with every probability of success. This has been so fully proved by many trials on a small scale, that there cannot be much doubt of such a method being capable of completely answering the purpose, and producing much benefit in the early raising of many sorts of poultry.—See the annexed *Plate*.

The sites of houses of this kind, as well as the spaces of ground that join them, which are always necessary where there is much stock of this sort, should in all cases be as dry and warm in the nature of the soil as possible, as young poultry are raised the best and most readily where that is the case; but with the most difficulty, expense, and trouble, where the soils are naturally wet, miry, and retentive, as most of such sorts of young stock are capable of bearing cold better than any excess of dampness or dirty moistness. In these cases, therefore, the sites of the houses and the grounds, where there are any, should first be perfectly drained so as to prevent any sort of stagnant moisture from being present; then, where the stock to be kept is large, the poultry-keepers' cottage or houses, and the divisions and yards for the poultry of different sorts may be formed and raised, which should be so placed as to face as much as possible towards the south, where that can be done, being well sheltered from the cold

blowing northerly and easterly winds, rains, and storms, the whole being strongly fenced in to a proper height, and made perfectly safe. The divisions where the poultry are raised, and the yards and places where they are fed and kept, should be laid with dry warm floorings, composed of lime rubbish in a fine state, chalky matters, or other such calcareous materials, in a firm manner, being thinly covered over with rather fine gravelly sand, so that they may be readily swept out, and be kept perfectly clean and sweet. The breeding divisions for the different sorts may have the lower parts of them properly divided for the sitting stock, and the higher parts for the laying, both being provided with proper nests at the back parts, and with light sliding shutters in the upper front parts for the occasional admission of fresh air and the sun in the early part of the day, which are very beneficial to the sitting birds and their young broods; the bottom parts of each having the provision of light close doors for being hung on when necessary to keep them separate, and free from being interrupted by the entrance of others, and their laying, or eggs for producing broods being thereby liable to suffer injury. The roof parts should be as high as they are capable of being conveniently made in such buildings, as most sorts of poultry which are not web-footed have the nature and habit of the pheasant, and are benefited by roosting high; besides, the perches are more out of the way, as, for the sake of cleanness, there should be only a single level range of them lengthways in any of such roosting-places, to which they may ascend in the best manner by an inclining light sort of ladder being set and fastened against them for the purpose.

In all complete poultry-houses there should be a convenient covered place for containing thick layers of different cleanly-sifted dusty matters for such stock basking, working, and dusting themselves among at their pleasure; as the propensity or habit is not only agreeable to them, but highly conducive to their health and thriving, by clearing their skins and feathers from injurious vermin and matters of other hurtful kinds. Such layers of dusty materials should be occasionally renewed when necessary. It would also be useful, in some cases, to have proper parts of the poultry grounds sown annually with spurry or other proper seeds for such sorts of stock, as their health and growth would be promoted by it, and benefit be produced in keeping them,

Where only a few poultry are to be kept, almost any sort of clean, dry, warm house or building, which has sufficient roosting height, will answer the purpose in a tolerably effectual manner; but there should always be a small well-enclosed yard attached to them, in order that the poultry may have fresh air and room to run well about, and indulge their natural propensities and habits, which greatly promote their health and growth, and likewise render them more secure. In this way it is usual to have the whole together; but it is always better to have the aquatic sorts and the others at least kept distinct, as they never do well together, their habits and modes of feeding and resting being so materially different.

The subjoined *Plate* contains the plan of a house of the above kind, capable of being heated, and made properly warm on the principles which have been laid down. AAA, AAA is a view of a complete connected poultry ground, with proper house and yard for raising and keeping the different sorts in a separated manner. Fig. 1, The poultry-keeper's cottage or house, containing in the upper parts feather rooms, and stowage rooms for the necessary food, *&c.* On the different sides of the en-

trance from the ground near the mouths of the flues, rabbit-houses or hutches may be formed or placed; and divided from which, fronting the hen-poultry ground, may be sheds with light doors for opening, and being strewed with different fine dusty materials for the use of the fowls. At Fig. 2, in the roof above the rooms, there may be a convenient pigeon-house if necessary. Fig. 3, *a b*, low flued wall for being heated in a graduated manner, by a suitable stove for rendering the inward shed divisions for the hen poultry properly warm, which wall need not be more than about four feet in height, being continued other four feet higher or more as thought proper by strong boarding or other suitable materials. Fig. 4. Proper divisions in the lower parts for the sitting, and in the higher for the laying, stock: and at the ends, *c d*, sheds for the roosting poultry, by which the whole may be kept suitably warm. Fig. 5. The hen poultry ground in the state of short grass for their running and feeding upon. Fig. 6, *e f*. Low flued wall for the shed divisions, for the laying, sitting, and hatching stock of the turkey, guinea, and pea-fowl kinds, having the same height. Fig. 7. Shed divisions for their laying, sitting, and bringing forth their young; *g*, roosting shed for the grown turkeys; *h*, roosting sheds for the guinea and pea fowls. Fig. 8. The ground for these sorts of poultry stock, which may be further divided if necessary. Fig. 9. Pheasantry, for breeding, raising, and keeping pheasants. Fig. 10, *i k*. Flued wall, three feet high, for heating and warming the laying and breeding places for the geese occasionally as wanted. Fig. 11, *l m*. Flued wall, two feet and a-half high, for heating and warming the laying and breeding places for the ducks when necessary; the upper parts of both which may be made sufficiently high by strong paling. Fig. 12. The ground for the aquatic poultry, with sheds and places near the flues for keeping their food in; *n n*, a walk by the water side, underneath which is a passage on each side, with bolted doors for admitting the different sorts of these poultry when necessary from the water to the grounds and yards; *o o*, small feeding yards for the sitting, breeding, and early rearing, geese and duck stocks or other water fowl. Fig. 13. Section and elevation of the divisions for the laying, sitting, and breeding hen, turkey, guinea, and pea fowls, *&c.* Fig. 14. Section and elevation of the places for the laying, sitting, and breeding, aquatic poultry of the goose kind. Fig. 15. Section and elevation of the places for the laying, sitting, and breeding, the duck kind. Fig. 16. Form of hens' nests. Fig. 17. Shallow tin pan, for holding food, gravel, and water, for the old birds and young broods of different sorts. Fig. 18. Coop, with sliding bars, for containing the hens or other sorts of poultry while rearing their young broods.

It would be further beneficial, in many cases, in raising the broods to have temporary strongly-framed sliding nets and thick curtains for drawing before the division for each nest of the breeding poultry when necessary; and between which and the outside boarding of the breeding buildings or sheds, there should be a suitable passage with a proper light. Also a door at one end, the top of the outward boarding having flaps to remain up or be let down for the admitting of light and fresh air, as there may be occasion, the whole being kept perfectly ventilated, clean, and sweet.

The heat and warmth which is necessary in such houses, in cold seasons, commonly ranges from about 75° to 80° on Fahrenheit's scale; by keeping them steadily to which poultry may probably be raised with little difficulty much

more early in such seasons than has been usually the case in any other methods of providing them which have hitherto been tried.

SECTION III.—*Aquatic Birds and Fowls, and their different Breeds and Sorts.*

THESE generally consist of swans, geese, and ducks, of different kinds, and require, as has been seen, suitable spaces of water in the raising of them to the greatest profit and advantage.

SWAN.

In the domestic state, the common white swan is the principal breed or sort which is met with, and valued for its fine stately appearance and ornamental effect on pieces of water, whether of the pond or river kind. As supplying food, this large fine bird is at present held in less esteem than formerly; but the flesh of the cygnet, or young swan, when properly prepared, after being well fed, is very good, and has been much prized for the table on particular occasions; and in the ancient manner of feasting, the swan constituted a dish of high embellishment and great pomp and show.

The longevity of this silent, majestic, and courageous bird has been considered extremely remarkable, from its having been confidently, but absurdly, asserted to live for the space of three centuries, which, if it were correct, would be much longer than that of any other animal whatever; but for which there is no sufficient authority, though it may probably live to a greater age than some other birds of the water kind. As the swan is fond of river weeds, and such as grow in other waters, it may be useful, on many occasions, for clearing them of such plants, especially where they do not abound much with the fry of fish, of which these birds are said to be very destructive.

LAYING, SITTING, AND HATCHING.

The hen of these birds usually begins to form her nest and to lay early in the month of February. Both the male and the female are much employed in preparing the nest, which is made with pieces of small sticks, long, decayed, grassy matters, and various plants of the water kind, in some snug secluded corner or part of the border or edge of the spot of water or stream on which they are in the habit of being kept. An egg is usually layed every second day by the hen, which, when she has produced about seven or eight, she mostly inclines to sit, which is continued for six weeks or more, before the young are so fully formed as to burst the shell and come forth. The egg, in this bird, is much larger than that of the goose, but white, and more hard, knobby, and thick in the shell, from which they require greater length of time in hatching. When first hatched, and for some time afterwards, the young birds have a sort of ash-colour, which they gradually change, but do not take on the forming of their full state of feather until about the end of the first year, nor to put on their perfect state of glossy whiteness till still further advanced in their age. While sitting, and in the time while the brood is in its young state of rearing, it is attended with danger to come too near the old pair, as the stroke of their wings is capable of doing great mischief, by the very strong muscular power which they possess in them, and their courage is not less than their power of injuring by such means.

FEEDING AND REARING THE YOUNG.

In the feeding and rearing of the young of these birds, the old ones take the whole care of them; the water is the principal source from whence they derive the means of their support and growth, as they feed more on the various

HEATED POULTRY HOUSE.

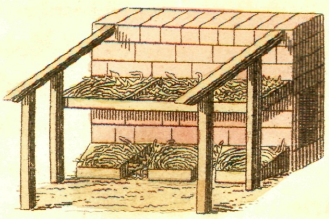


Fig. 13.

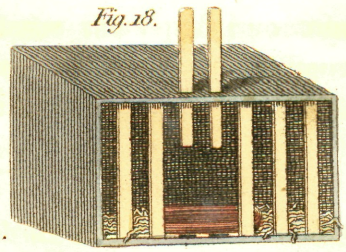


Fig. 18.

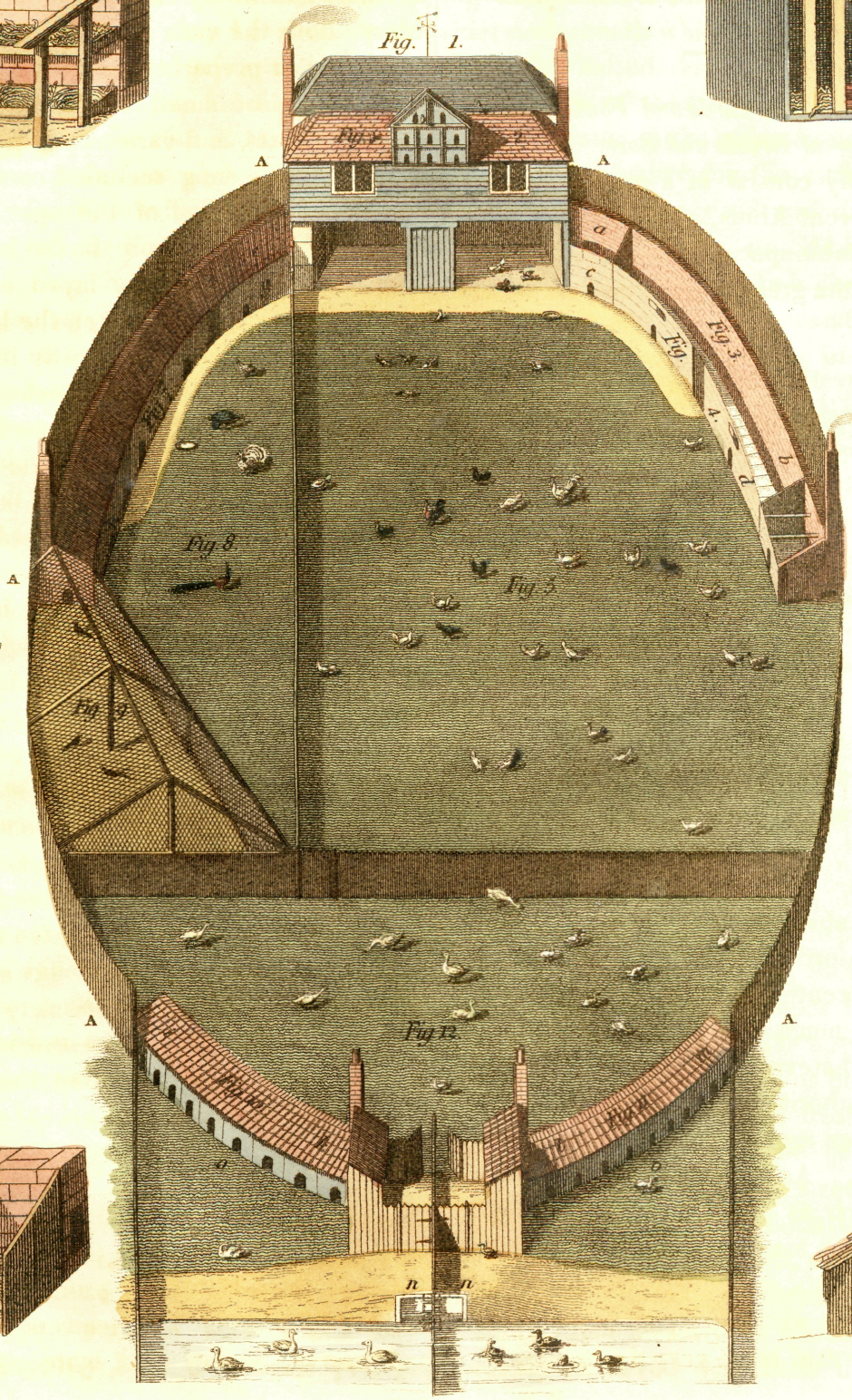




Fig. 16.



Fig. 17.

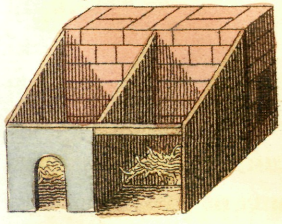
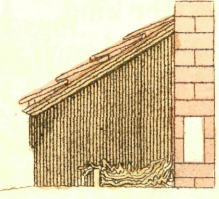


Fig. 14.

Fig. 15.



London, Published by Thos. Kelly, 17, Paternoster Row, Nov. 22, 1823.

weeds, roots, and plants of the water kind than the goose, but eat much less grass. The young cygnets continue longer in care with the old pair than is the case with the goslings and the old geese, the example of which they follow in getting the sorts of water food which is necessary for raising them to their perfect growth. If it be true, that they are devourers of the small fry of fish, they may draw some of their rearing food in that way, where the fish are abundant in the waters where they are kept. They are often capable, however, of being fed to advantage with many sorts of food of the waste bread and mealy kinds, in combination with these matters.

FATTENING THE YOUNG PRODUCE.

The young cygnets, when of a proper growth, are sometimes fed well, and fattened for the table, as a rare and elegant dish, as they only are capable of being made use of as food, the old birds being too coarse and tough in their flesh. In this case, they must have, with their usual water food, something of the grain or other such kind given them, somewhat in the manner of the goose, but without being in any way cooped up or confined. In this practice they eat such food, and also the crumbs of bread or biscuit, with much eagerness, and soon become familiar with the person who has the care of them, becoming, in a little time in good condition for use as food. As when thus fed and fattened the young birds sell at a high price, as a pound or more each, they may be supposed to afford a much finer and better sort of food than is commonly believed, and, of course, to be more deserving of attention, in that view, than has hitherto been the case.

GOOSE.

In the goose kind of birds, though there are a great number of breeds and varieties, which differ much in their nature, size and plumage, yet but few of the sorts have been domesticated and made use of in the economy of the country. The chief of those breeds or sorts which are had recourse to, in this view, are the common kind, in which the male bird is mostly of a pure white, while the female is variegated or spotted with grey; the Embden sort, which is all over white in the female as well as the male, and of a very large size; and the Spanish breed or sort, which are greatly esteemed by some. But whatever the breed or sort may be which is made use of in the above intention, the properties of ready feeding and goodness of flavour in the flesh, with those of laying, sitting, and hatching well, are very material to be attended to, as much of the success and profit depend upon them. It is probable, that the best geese, in these respects, may be met with on the border parts of the counties of Norfolk, Suffolk, Berkshire, and some other more to the north, as in the neighbourhood of Durham.

The age of the goose is well ascertained to be of much length, as it has been satisfactorily proved to have reached that of seventy or eighty years and upwards, and then, but for accident, been supposed, in the latter case, capable of living for many years longer, with an apparent continued fecundity.

The flesh of the goose, in the wild state, is far inferior to that of the tame bird, being less tender, and of a fishy taste. It is a circumstance of much singularity and curiosity, in regard to taste, that the ancients held the flesh of the swan as a great delicacy, while they rejected that of the goose as impure and unfit for food; and, on the contrary, the moderns refrain from the flesh of the swan, while they consume that of the goose with great and general relish. The fancy breeds, varieties, or

sorts, of the geese of other countries, are principally had for the sake of curiosity, and the ornamental effect which they have on the lawn banks of pieces of water.

LAYING, SITTING AND HATCHING.

In the breeding and raising of geese, it is usual to have about four or five geese to one gander, as constituting each a separate stock; as many distinct sets being had as may be necessary. But some have found that two are more proper, and capable of affording better and more certain success in breeding this sort of stock. And in some districts, where vast numbers of geese are raised, it is said to be the practice of the large breeders, to have only one goose to a gander, as producing the most advantage in the certainty of the breeding, and also in the rearing of the young broods, from the better attendance of the gander. In providing old or store geese-stock for breeding from, it is necessary to be careful to take them from such as are favourably large in the size, with well-tasted flesh, and from situations where they have been well kept at all times. And, if descended from such as lay, sit, and rear their young well, it will be so much the better. The male birds, or ganders, should be large, strong, and well made, and from such stock as is naturally prolific, being firm and well grown, with sufficient age. The goose to be well and properly formed, should be short in the leg, not too large in the head, quick and lively in the eye, the neck not too long, but somewhat fine where it joins the head, and gradually enlarging until its junction with the body, which should be large and full. The only difference in the male bird, or gander, should be, that of being considerably larger in all the parts. By proper care and attention in these several respects, the most success and the greatest advantage may be gained from this sort of stock.

In breeding geese, it is the practice of some to prefer the mixing of the breeds or sorts, as the dark grey female kinds with the large white male sorts, as found in the last of the above districts, where they are much larger and heavier than the common kinds; as it is supposed that the dark grey goose is much more hardy in its nature than the white, though the skin of it in some cases may be unfavourably dark for the table; yet that of the produce of the mixed sort, although there may be the appearance of dark feathers on them, will mostly be white, and they will be much larger than the common unmixed breed of the female parent, but not quite of the size of the original stock. This mixed breed is very prolific and beneficial in raising the young broods.

It is always proper and advantageous to have the production of the young as early as possible, which is constantly much favoured by the earliness and warmness of the late winter and beginning spring months, but still more fully by the aid of proper houses and good full keeping of the breeding stock during the whole of the later winter months and towards the beginning of the breeding time, as thereby they will lay much better and more early, and in some cases there may be proper time for having two broods within the same season, which, though not common, is sometimes beneficial. This circumstance has in some cases caused a high value to be put upon such stock, in consequence of its taking place for several seasons in succession, as though it were a particular and more excellent breed than that of the usual kind. The feeding of such stock in the late winter time is best performed by some sort of good proper grain, as that of the oat kind; and towards the laying season, to have recourse to

soaked or softened grain of the barley kind, steeped malt, good pollard mixed up with small beer, and other such forcing substances.

When a disposition for forming her nest and laying is shewn by the goose beginning to take up and carry straw and other such matters in her bill, it is necessary to provide and put the materials for it in a proper safe place on or near the ground, when she will soon form them in the proper manner, and commence the laying her succession of eggs, which is commonly from ten to fourteen or fifteen; which, when completed, are sufficient, and she begins to sit, and continues it for about thirty days, as her eggs are large and rather thick shelled. This inclination is shewn by sitting longer on the nest than is usual. The eggs should be confined in the nest, so as not to roll out when turned as they are daily by the goose. While in the act of sitting, the gander watches the geese to see that nothing disturbs them, regularly keeping his post at or near the door of the house or place in which they sit, to guard them from the intrusion of vermin and accidents.

The nests for laying and sitting geese are best made of matters which are not too soft, as wheat or barley straw, not being raised too much, as is too often the case. They should be of the proper size for holding the number of eggs which are necessary in a perfectly safe manner, without crowding or resting too much upon each other, and that the whole may have a regular and proper degree of heat from the goose in the time of sitting. While the geese are laying, the eggs should be regularly taken away from them, and be so marked that they may be put under the goose which laid them, as it may be beneficial in ascertaining which afford the best and the most abundant produce, as well as in the more kindly sitting of the birds. The eggs should also be so kept in the time of collecting them from the geese, that they may be dry and as much as possible excluded from the air by means of sweet bran or some such mealy substance. The places where the geese sit and produce their young should be near water, being dry, warm, and well exposed to the sun in the early part of the day. In hatching, on the bursting of the shell, when the nib of the young bird appears, it may occasionally be necessary to break it further to give more room for its liberating itself; and the just wetting the bill of the young gull will sometimes be useful in giving it more life and strength.

The feeding of the geese while sitting is but seldom necessary, as they generally leave their nests for a very short time to provide their necessary food and drink, but rarely go much into the water, as it would often have a bad effect in cooling the eggs. But sometimes food, drink, and fresh sand are placed near them, which, however, should never be of the too heating kind. They rarely or never quit the nests, however, for any length of time until the hatching of the young is fully completed. It is very seldom proper or necessary to take any of the goslings away after being just hatched, though the too common practice, as the warmth of the mother is highly beneficial to them in both preserving them and promoting their growth; and besides the goose from her strength and resoluteness in their defence might cause the destruction of some of them in the attempt. In case the weather be warm the hatching generally takes place sooner than when cold. The young gulls should be continued with the goose in the nest, the place being well secured against the entrance of rats and other vermin, where they must have food, sand, and fresh water, such as bread crumbs, grits, rice, wheat and clivers, chopped small, of the first sort. Where, however, the young

gulls are taken from the goose, as is frequently the case, from the groundless fear of her becoming uneasy and not hatching all the eggs, they are usually put into a basket with dry warm wool, covered by a woollen cloth, and placed at the fire corner, being every few hours taken out to have a little new milk or water given them, with some small chopped clivers, and after a short time the use of a green sod, from which they may pick the grass. When the whole brood have been hatched, those that were taken away are returned to the goose, for which purpose the morning is the best time, as there is less danger of any that may be weak being trodden to death by the others, than when it is done in the evening. They must in all cases be carefully watched for some days at first to protect them from vermin, accidents, and injuries of any kind.

FEEDING AND REARING THE YOUNG.

After the newly-hatched gulls have continued in the nests with the old geese for a few days for the purpose of getting strong and active, as well as to prevent their being injured by any damp or moisture that may be present in or upon the ground, which is liable to produce the cramp, and speedily destroy them in so young a state, it is necessary to turn them with the goose upon a plat or portion of ground which is well sheltered, dry, and in a short state of grass, such a plat or little enclosure being always, if possible, attached to the houses or places where such poultry are kept. Here the old goose should be daily confined to a certain small piece by means of a few light hurdles, which, when set down, are sufficiently open at the bottom to let the young goslings pass in and out to pick up any thing they may like, and begin to eat the grass. Into such fresh little portions the old goose and her young brood should be put out every morning, when the weather is suitable, as soon as the day begins to get fine, and be taken in again rather early in the evening, according as the weather may be at the time. When more broods than one are raising at the same time, it may sometimes be necessary and useful to separate them by close hurdles set across the grass piece, though they are not much inclined to disagree or be uncomfortable with each other, and the gulls constantly know well and return to their own mothers. The practice is, however, convenient and saves trouble in different cases. In this manner they may be kept and reared with much safety and advantage until they become quite strong and able to follow and feed with the old geese; they having different green matters, such as young clivers, lettuces, and such like mild stimulating vegetable substances, given them at first; and gradually afterwards have some perfectly fresh grains, good pollard or fine barley-meal in mixture with good potato flour, and occasionally a few oats, as their food, by which they generally get on very fast in their growth, and become very fine gulls.

They will now become fit to feed in other places where the grass is not too coarse and rank; but as they are some of them apt to get tired out, cramped, and to be lost by being too much dragged about by the old geese, when first turned out, where the range is extensive, as on large commons, it may be more proper, safe, and beneficial, where it can be conveniently done, to put them into a properly large pasture field which is near at hand, and where there is water fit for the purpose; as by such means they will besides be more readily seen and attended to in case any unfavourable circumstance or accident happens to them. All such noxious herbs, plants, or trees, which may destroy them by their poisonous qualities, such as

hemlock, night-shade, and yew, should be carefully extirpated in order to prevent such injuries.

As the goslings become more fully grown and feathered, and there is not the necessity of their being fostered and kept warm by the heat of the old geese in sitting, covering, and brooding upon them by their wings, they take their lodging in the night-time in the house near to and with the goose that produced them, which it may in some cases be necessary and advantageous to litter down well and frequently with fresh littery or other suitable materials, such as fern, barley straw, dry saw-dust, and other such substances, as by such means much good manure may be raised in a cheap manner. The young geese, being thus grown and strong, are capable of feeding in the waters and the pasture wastes, where they are conveniently situated for the purpose, without having any other sort of keep; but it is a highly beneficial practice, which should constantly be had recourse to as much as possible, to continue the feeding them daily in the morning before they are turned out, and in the evening on their return home, as by such means they will be reared and raised to the largest size and the greatest perfection in every respect. The food in this practice may consist of fresh brewers' grains, carrots or parsnips chopped small, cabbages cut small, and lettuces, with a very little grain of the barley or oat kind.

In these methods of rearing and keeping such sorts of young stock, they will in general be nearly ready as green fed geese without any great further expense or trouble, by merely feeding them well with oats, malt, or cut carrots, and their usual green keep, for a week or ten days, as they are never perfectly good without being thus fed for a short time before they are killed.

FATTENING THE GEESE WHEN FULL GROWN.

This is performed in different ways, as the situation and circumstances of the case may be; but the cheapest and best, probably, so far as the flavour of the flesh is concerned, is that of the corn stubbles, as in these in many cases they in a short time become sufficiently fat, and are perhaps preferable to those which are confined and more highly fed, as being less greasy and better tasted. But when they are thought not to be enough fed in such stubbles, by being put up for a week or two with such food as is directed below they will commonly become completely fat, and have a delicate taste with a firmness and tenderness of the flesh. In these kinds of close fattening geese, they should constantly be kept perfectly clean and sweet by having repeated fresh portions of clean straw put for them to rest upon, with a full quantity of pure water for their drink, and that they may in some measure indulge in washing and picking their feathers. The keep in such cases may properly consist of the best oats in the unground state, malt, fine pollard, with meals of the rye, pea, or bean kind, and other highly forcing substances of the same nature, which latter may be used in mixture with suitable liquids, as waste milk or the infusion of linseed in warm water. In the extensive goose-feeding system which is practised in the vicinity of the metropolis, where the best fed and finest flavoured geese are produced, the principal circumstances which seem to be depended upon in their fattening are those of keeping them constantly in the most perfect state of cleanness, and the feeding them regularly with the best and most pure food of the grain and other such forcing kinds. In this confined feeding practice the geese should likewise be well supplied with fresh sand in a shallow trough for the purpose.

In fattening geese there are several circumstances which require to be well regarded and attended to, in order to their producing the greatest advantage and profit to the keeper; such as the nature and cost of the keep, the size of the geese, their increase in weight in different portions of time, and the length of time which they can be kept in the increasing state with the most benefit, or so as to properly pay for the quantity of food which they consume, and some others of less importance.

FOOD AND INCREASE IN WEIGHT.

With oats of the best quality as food, and water as drink, the consumption of the former was found, by different trials, to be from one and a half to two quarts in the day, which is probably about the average quantities generally eaten by fattening geese in the confined state, in that length of time; the value of which keep will be about from three halfpence to two pence in the day, or a little more than one shilling in the week; and the proportional increase in the weight of flesh and fat be nearly as below, in such different spaces of time, in birds of this kind of the more large and middling sizes.

In a male or gander of the larger sort, and a female or goose of the middle sized kind, the weekly weights gained were these:

WEEKLY INCREASE.

	Weeks.	*lbs.*	*oz.*
In the male bird	1	2	1½
	2	1	1
	3	0	9¼
	4	0	1
In the female	1	2	7½
	2	0	12
	3	0	2½
	4	0	1

From these results, it would appear that geese are not capable of being fed and kept in the confined manner, so as to pay sufficiently for their food, for more than from two to three weeks, when fed in this way; but as they increase greatly at first, while the keep has its full and most powerful effect, it is not improbable that by properly varying it in the latter stages of the process, by changing the form and manner of giving it and using other suitable substances in an alternate manner along with it, such as the mixed or unmixed meals of the barley, malt, and pea kinds, a more full increase may be gained for a longer continuance of time. When geese, however, are kept too long under the fattening process in any way, they decline in and lose much of their valuable fleshy substance, becoming in a great measure all loose fat, which is much wasted in cooking, and of little use. There is reason to believe also that the larger geese pay the most for the food they consume in different lengths of time they can be kept in the proper increasing state of feeding.

PROPORTION OF LIVE TO DEAD WEIGHT.

	lbs.		*lbs.*	*oz.*
In large sort alive	14½			
Do. dead		Carcass	8	10
OTHER PARTS.				
Blood			0	8
Giblets			3	8½
Feathers and wings			1	0
Loss in killing and dressing			0	13½
			14	8

	lbs.	*oz.*		*lbs.*	*oz.*
In smaller sort alive	11	10			
Do. dead			Carcass	7	9
OTHER PARTS.					
Blood				0	7
Giblets				2	10
Feathers and wings				0	11½
Waste in killing and dressing				0	4½
				11	10

PROPORTION OF BONE TO MEAT.

	oz.
In carcass of large sort	14
—— smaller —	8¼
In giblets of larger —	5¾
—— of smaller —	5

Or rather more than one ounce to the pound of meat in both cases.

EXPENSE AND PROFIT.

The former of these has been seen to be in

common about one shilling the week; but the latter necessarily varies greatly at different seasons and times, and as the nature of the supply may be; yet, as when the geese are at the lowest, they are rarely less than nine pence or ten pence the pound in the better sorts, and sometimes much more, the profit may in general be estimated at from about 2*s.* 3*d.* to 2*s.* 6*d.* in the larger sort, and from 1*s.* 6*d.* to 2*s.* in the smaller.

Geese are a sort of birds of the poultry kind which are probably the most profitable of any to the keeper and feeder, as they require but little, except grass, for their general keep in their growing states, and no great quantity of better or more valuable food in completing their fattening process.

The nature of the houses and other conveniences, for the keeping and feeding or fattening geese and other aquatic fowls in, has been already considered.

MUSCOVY OR SWAN GOOSE.

This is a sort of goose which is of the medium size between the common one and the swan, and which is not uncommon in this country; but which, when made to breed with the geese of the common kind, produces no bad effects or faults in the produce that is afforded, but rather enlarges and improves the size, which may consequently be useful in some cases. It is known and readily distinguished by the erect manner of its gait and by the continued screaming noise it makes for the most part of the day without having any sort of inducement to it. The methods of managing, rearing, keeping, and feeding this sort of geese, are much the same as those which have been given for those of the common kind, but they require rather more food. The quantity of meat which they afford is larger, but not so fine in the quality as that of the common goose.

DUCK.

In the duck sort of poultry there is, perhaps, equal or more variety in the size, colour, and other circumstances, than in that of the goose; but there are yet only a few of the kinds and varieties in the fully tamed state, so as to be useful for domestic purposes; and those in the wild condition have an equal or probably superior flavour, and more game taste in their flesh, though that of the common duck in the domestic state is somewhat more stimulant, tender, and digestible in its qualities. At all times the duck has been highly esteemed, not only for the quality of its flesh, but for its mild tameness, the readiness with which it is provided, and its being so greatly prolific. And the ancients, besides, considering the flesh of it as most exquisitely delicious, absurdly ascribed to it other great properties of the medicinal kind.

The principal breeds, sorts, and varieties of the duck which are raised and in use in this country are those of the common brown and speckled brown and white kinds; the common white variety; the large beautiful white Aylesbury, which are usually supposed early breeders; and the Rhone duck, which is commonly dark in the colour, and of a large size. This is a sort which may be useful in improving the common brown spotted kind, as with the above property of size the flesh in it is darker, with somewhat more flavour. In consequence of this sort having now been so much introduced, they are often found in mixture with the common brown sort. The American canvass-backed sort, which are raised chiefly on the banks of the Susquehanah and Potowmac rivers, are asserted to be of a very superior kind; but they have yet been little introduced into this or other European countries, so that their use and advantage cannot be well ascertained.

The Muscovy-hawk, billed, and other such sorts and varieties, are rather in use for the curiosity and novelty which they afford than for the purpose of supplying food; but they are fine sorts of ducks, and the first of a very large size.

In all cases of the duck kind, where the flesh is inclined to be light in the colour, it is constantly less highly flavoured and fine than when of a darker cast.

The habits and manners of the duck, both in and out of the water, like those of the goose, are quite simple and natural. They go out and come home in an almost constant regular manner, being mostly fronted in their line of walk by the older ducks in which the males lead the way, and are followed by the old females and the whole flock in exact order. They feed somewhat differently from the goose, as they are greedy of substances of the flesh kind, as well as of those of the insect, slug, snail, weed, vegetable, and grain kinds. It is curious and somewhat extraordinary to observe the familiar habits and circumstances of these birds in the wild state where they collect together in such vast numbers, which is usual on large ponds and sheets of water, as each of them appear to be perpetually in motion, sometimes indulging in a sort of mass on the surface of the water, then rising in a body with much noisy quacking, and again descending upon it in a sort of regular order: they thus seem to be picking and trimming their feathers, as well as amusing themselves, and probably may collect some sort of useful food. This is the case with the common wild ducks, as well as with the *Eyder* ducks, which are so much prized for the fineness of their down, and which resort so much to the lakes and waters of the more northern countries, where they are called down in their flight by the hoarse, loud, peculiar, voice of a mallard on the surface of the water below, until the piece of water, which was before free from them, is wholly darkened with their presence.

The age to which the duck, in the tame state, will live, though not nearly so long as that of the swan or goose, is probably considerable; but it has not been well ascertained.

These birds, like the goose kind, may be raised and kept to the most advantage in all cases, where there are extensive sheets or pieces of water, on which they can rest in the day-time, as requiring the least feeding, trouble and attention.

LAYING, SITTING, AND HATCHING.

In the practice of breeding and raising this sort of poultry stock one male bird, or drake, will be sufficient for three or four ducks at least, which will form one set or stock for the purpose, more sets being had in proportion to the convenience and the means of supplying them with food. It is the best practice, however, not to have too many females to the males. In choosing the ducks for this use, they should be taken from those sorts which are large, well-flavoured in the flesh, and known to be descended from such as lay well, and sit with sufficient regularity and closeness, as well as from those which are careful and attentive in the rearing of their young, as by such attention the best and most proper store ducks may be provided. The male bird, or drake, should be strong and well sized, and from a sort which is of good flavour in the flesh, and prolific in their nature, as well as full and perfectly grown in all respects.

Some persons suppose that the most beneficial practice in the view of raising these birds is the mixing the breeds, having the male, or drake, of the large black kind, and the female, or duck, of the grey sort, as the latter is the

most hardy and the best fleshed, and the former of the largest size, by which the produce become the largest and the most valuable in their flesh, as well as other properties. Any of the proper large unmixed breeds as above answer the purpose equally well, however; and better, in some cases, as for the production of early broods. It is usual in some large duck breeding districts, where they have them raised very early, as about the close of the year, to prefer the large white sort, as they stand the necessary forcing keep in such cases much better than the other sorts, though naturally more tender, and are sooner more fully feathered and put in proper condition for sale.

Breeding ducks generally begin to lay early in the new year, as towards the middle or end of the first month of it or very early in the succeeding one, where they are properly well fed, which should be as much as possible the case as early-bred ducks are valuable; but, as the laying ducks are careless in the forming of their nests, attention is necessary at this season to see to them, as they often lay many eggs without any proper place being provided for them, they being often dropped in the water, or irregularly in other places. The nests, or materials of them, may, therefore, be in some measure laid for them in some retired safe part on the ground-floors of the houses or other places, where they are kept in the night time, being simply formed of a portion of soft straw, raised a little from the surface of the floor, that the eggs may not slip out in the time of sitting. As the ducks lay, their eggs should be collected, marked, and laid aside, as those of geese, in a proper safe place, until they are wanted for putting under them.

It was formerly a prevalent notion that those sorts of ducks, which had the points of the bills more turned up than the other kinds, were the best layers; but there is, probably, little in this circumstance,—as, when well fed just before the laying season there is little danger of having plenty of eggs from almost any sort. It is common with the duck to lay late in the night, or very early in the morning; but sometimes, when the weather is very cold, frosty, and severe, the laying is protracted till after the middle of the day. When the duck is thus ready to lay, it may, however, be generally known without examination, by the weight and sinking which is shewn in the hind parts. When the ducks are become well used to their nests they rarely leave them, but are rather tenacious in keeping them. It is usual to suppose that each set duck should have her own eggs, but which is probably not material, yet it may be proper and useful for each to have all the eggs of the same colour and kind, as such ducks as are light or quite white in their colour lay eggs which are of the same cast; while those which are brown or dark in their colour lay those which are of the blue greenish cast, and larger in size; consequently, it may be the best and most proper and safe to have all the eggs of the same colour and size, as ducks occasionally turn out of their nests those eggs which are not of their natural size or colour. When the duck swims with the tail and hind parts level with the surface of the water, it commonly shews that the egg is ready or nearly so for being dropped. In promoting the early laying of ducks, as in the above cases, warmth is found to be essentially necessary, especially in the night-time, and the more regular it is preserved at all times the better; with which good keep of the raw flesh meat kind is used, such as coarse beef and other matters of the same or similar kinds. The first layings of their eggs in such cases

are not hatched by the ducks themselves, but by hens and sometimes by turkeys, which are found still more steady and persevering, so as to hatch two or more broods in the same season, but which is always hurtful to them, and sometimes destroys them.

The duck, in raising her own brood, is capable of covering a great number of eggs on being set; but from eleven to thirteen, or thereabouts, may be quite sufficient for the purpose. The time of sitting is about thirty days; in which it is a good practice, to let the sitting ducks have some food and water near them, to prevent their leaving their eggs to cool too long, and thereby injure them, though they are generally pretty regular in their returns in these circumstances; and, besides, mostly cover them for the time they are off them in search of their food, and the water which is necessary as drink, with some light dry substance. As soon as they are hatched, the young ducklings should be suffered to continue under and with the ducks in the nests till they become quite strong and active; when they are to be turned or let out, and removed in the day-time, while warm and sunny, upon the fine, short, grassy plots that adjoin the houses or places where they are kept at night, the old ducks being daily confined on fresh large pieces, by proper coops for the purpose, with their suitable food, and the young ducklings carefully well fed at first with soft new rice, grits, or bread crumbs, put ready for them; then with the mixed-up barley paste or oatmeal, and the meal of the roasted or boiled potato, made fresh and fresh, and rather thick and crumbly with milk; after which, good fresh brewers' grains, and a little barley or oats may be given in continuance, fresh sand and water being constantly at hand, in shallow pans or troughs for their use. As they thus advance in their growth, in the duck-breeding system of practice, there is commonly a provision of worms, slugs, snails, and other sorts of insect animals provided for them, and combined with the ground mealy food, and the grain in its natural state. The ducks should always, in these cases, be cooped and confined separately, and at a distance from each other, as otherwise there may be inconveniences arising in different ways. The length of time of their being confined to the coops must, of necessity, depend on the state of the weather, and the growth and strength of the young ducklings; but ten days, or a fortnight, seems as long as ever may be necessary, as they will, in many cases, be quite ready and fit for feeding and benefiting themselves by the use of the ponds and sheets of water in the course of little more than a week; but in such cases, especially where the weather is cold and moist, it should not be usually done for too great a length of time at once, as they may thereby be caused to become cramped, or to be affected with the scour, and have a rough, dirty, unthriving appearance. It is always of much utility and advantage, to have them kept perfectly clean and sweet in the houses and places where they are kept in the night, by letting them have full repeated allowances of clean dry straw to rest upon, as by such means they thrive much better and more quickly. It may sometimes, in wet rainy weather, somewhat contribute to the ducklings being less dirtied and weakened in their feeding, by having their tails clipped; but it is not a good practice, or one which is often necessary, as it is unnatural and hurtful, by the exposure it causes, and impedes their habits of indulging in the water and procuring their food.

It is sometimes, as has been seen, the practice to hatch and raise ducks under hens and other birds; but it is a means that rarely suc-

ceeds well, except where they are raised in the early cold seasons, as the nature and habits of the hen and the duck are quite different, and those of the former by no means suited to the raising of such birds in almost any case, as such young may, in any situation, be as easily and readily raised by the duck as the hen; and in scarcely any circumstance or situations can the duck be bred to advantage without the use of ponds or pieces of water.

In the early practice of raising young ducks by means of other birds, the ducklings, as soon as they are hatched, are removed to the fire-side, and kept sufficiently warm without the aid of the parent bird, in some convenient contrivance for the purpose; when they have the flour of malt and new milk given them for a few days at first, after which a paste formed of barley-meal with milk is had recourse to; by which manner of feeding they come to a very large size and state of fleshy fatness while they are quite young, and afford considerable profit to the breeders. This may be a safe and ready method in such cases, as allowing of many broods being raised in a short time, but there is considerable trouble and attention necessary in it.

FEEDING AND REARING YOUNG DUCKS.

In the rearing of the young duck produce to their full and most perfect growth, they must be constantly well fed and kept; in doing which, in the best and most profitable manner, substances of different kinds, in combination with those of the water and grain sorts, may be usefully employed, twice in the day, at least, as in the mornings before they go upon the waters, and in the evenings on their return home. As young ducks are great, but not dainty, feeders, they should have, in the mornings, full quantities of perfectly fresh brewers' grains given to them, with a small portion of the best oats, and a few lettuces, or other suitable garden vegetables, where they are at hand; and in the evenings be well supplied with such grains, in mixture with the meals of different sorts, in an alternate manner, such as those of the more coarse oat, barley, pea, buck-wheat, potato, and pollard kinds, with such vegetable matters as the above. And where there are any sort of waste, greasy, or other animal substances, to be had, they may have a little in addition to their other food, which will be greatly beneficial in promoting their growth, and in rendering their flesh of the best quality. Without being thus fully kept and forced in their growth, young ducks are not to be raised and kept in the best perfection, whatever food they may get from the water or other sources. Where corn-fields are conveniently situated, and the crops are in danger of being destroyed by caterpillars, slugs, worms, and other such vermin, ducks might occasionally be turned in, in the day-time, with much benefit, in getting a desired sort of food, as well as in destroying such creepers.

FATTENING GROWN DUCKS.

In the fattening of full-grown ducks, there are two methods in which it is chiefly performed, as that of being suffered to have their natural water food, with as much of that of the dry solid grain and other kinds as they are capable of consuming; and that of being closely confined in suitable places for the purpose with suitable food. The former has the advantage of being the more natural, but the latter is probably the more certain and expeditious in accomplishing the business, as the ducks are less employed in the exercise of getting their food, and, of course, more disposed to sleep and rest quietly, as well as less affected by the light, as they should be in rather darkened houses or places, all which circumstances contribute

greatly to forward and hasten the fattening process; while in the contrary state, though they have their natural food in its various states and kinds, and in mixture with the different sorts of dry grain or mealy keep, in sufficient abundance, they do not, in general, go on so well, or become so fat, probably in consequence of the greater exposure to the disturbing and irritating effects of light, and the continual motion and activity in which they are kept. They are rather brought into and kept in a good condition than rendered fully fat, even where they are at first in tolerably good case, when the practice is begun. There should never, in either case, be any sort of hankering after or pining for want of the necessary fattening keep, but the process proceed with due regularity in proportion as it is more or less abundantly taken in and rendered nutritious by the digestive power of the ducks. Full quantities of either grain in its whole state or in that of its reduced and mixed condition, which are, with a little finely powdered cake of the linseed kind, unquestionably the best and most feeding sorts of food of the vegetable kinds, should be constantly left in readiness for the ducks in the places where they usually have their food, for them to eat of whenever they are so disposed. It is evident, indeed, that in the whole process of fattening these kinds of fowls, almost every thing depends on their being fed with such sorts of food in a regular and steady manner, and on their having always before them full fresh supplies of water and sand, when in the confined state; while, at the same time, they are kept in a perfectly quiet detached situation, which is not too greatly exposed to the action of light, but preserved in a well-aired, clean, and sweet order. Where, however, the fattening of ducks is effected by means of waste animal matters of the offal, garbage, or other kinds, which is perhaps the most ready and easy method, the flesh has certainly more of both the colour and flavour of the wild duck, than in the usual modes of accomplishing the purpose. The small gutty parts of sheep and some other animals, are much used, and found a very good sort of food for these birds in this intention. In the proper season, the acorn, too, is capable of rendering the duck readily fat, in a very high degree, when used alone, and the flesh is firm, highly-flavoured, but perhaps somewhat less delicate and fine. The ducks, in this way of being fed, may have their free range under the oak-trees, and collect their own food, without causing any sort of trouble.

There can, however, be no doubt, but that oats, either in the whole, bruised, or quite reduced state, with animal matters, are by much the best and most proper sorts of feeding materials, in general, for these fowls; but, at the same time, the meals of peas and barley are capable of making them sufficiently fat without the flesh being less firm, less dark in the colour, or in any way deficient in the excellence of the flavour. Many trials which we have made have fully ascertained this; and those of others have shewn, that malt has not only an astonishing quality in causing them to become fat while young, and very delicate in their flesh; but that, for the flavour it affords to it, there is no other sort of food which is equal to it. And that old ducks are capable of being fattened with almost any sort of proper food in a ready manner, but especially with animal matters in the mixed state, with meal of the oat or barley kind.

In fattening ducks, as well as geese, there are many different points and matters that demand particular consideration and attention in the feeder, in the view of getting the most profit for his trouble, and the expense he may

be at in providing the necessary food for the purpose, such as the kind and cost of the food or keep, the nature and size of the ducks; their increase in weight in different spaces of time, and the lengths of time which they can be continued in the increasing condition with proper benefit, so as to pay sufficiently for the quantity of food which they consume, &c.

FOOD AND INCREASE IN WEIGHT.

When fed with grain of the oat, barley, or some other such kind, having water to drink, or the free use of it occasionally, the consumption will generally be found to be about one quart in the day for most sorts of ducks in the more confined fattening state, the value of which will mostly be less than sixpence in the week; but in feeding with waste animal matters and a small portion of barley-meal, the cost will often not much exceed one penny or three halfpence the week, and the proportion of increase in the weights of the flesh be somewhat as below in such different portions of time in birds of about three and four pounds' weight of such breeds as have been considered the best for the purpose:

WEEKLY INCREASE.

	Weeks.	*lbs.*	*oz.*
In the former	1	0	6½
	2	0	4
	3	0	2
	4	0	0½
In the latter	1	0	8½
	2	0	7¼
	3	0	3½
	4	0	1

From these states of increase, it may be concluded that the duck in general cannot be kept in the more close fattening state in these modes of feeding for more than about a fortnight; but if the grain and animal matters were properly varied, combined, and given, such birds might probably be continued a little longer at a sufficiently increasing state to pay the keeper.

PROPORTIONS OF LIVE TO DEAD WEIGHT.

	lbs.	*oz.*	*lbs.*	*oz.*
In the smaller, *alive*	3	7		
Do. *dead* . Carcass			1	15½
OTHER PARTS.				
Blood			0	2¾
Giblets			0	11½
Feathers and wings			0	3¼
Waste in killing and dressing			0	6
			3	7

	lbs.	*oz.*	*lbs.*	*oz.*
In the larger, *alive*	3	14½		
Do. *dead* . Carcass			2	4½
OTHER PARTS.				
Blood			0	3
Giblets			0	12½
Feathers and wings			0	4
Waste in killing and dressing			0	6½
			3	14½

PROPORTION OF BONE TO MEAT.

	lbs.	*oz.*
In carcass and giblets of smaller	0	5¼
Do. larger	0	6¼

Or more than one ounce and a half to a pound of meat, in the former; and rather less than two ounces to the pound of meat, in the latter.

EXPENSE AND PROFIT.

These are liable to vary so much from the nature of the food which is made use of in the fattening of the birds, and the manner in which they have it given to them, as well as from many other circumstances, that it is difficult to form any just estimate of the profit they may in general afford to the breeder or keeper, but under good management with the mixed grain and animal sorts of keep they will probably, in all cases, leave that of from 1*s.* 4*d.* to 1*s.* 6*d.* each, and sometimes more, as the cost of the food is so little.

On this and some other accounts, as already seen, the duck may often become a very valuable sort of poultry stock in many situations and circumstances.

WILD DUCK DECOYS.

The forming and establishing of these contrivances and modes of taking wild water-fowl

of the duck kind are matters of considerable importance and profit in certain situations and circumstances which require to be noticed. In cases, where there are large extents of water in shady retired situations, at but little distance from the sea-coasts, these may often be formed with the probability of much advantage, but in other situations they can seldom be attempted with much chance of benefit. They are not unfrequently had recourse to with success in the wild parts of Essex, Norfolk, Lincolnshire, and some other similar districts, where lakes and large pools of water abound, which are nurseries of vast flights of wild fowl of different kinds, but chiefly wild ducks, which are taken by these means in great numbers on their margins; and in other such suitable situations they may become equally objects of profit. Much judgment and knowledge of the habits and economy of such fowls are necessary in the forming and conducting of them with propriety and perfect success, as the requisite passages, nets, and screens, must neither be too straight, too close, and confined, nor too narrow at the mouth parts, while there must be proper banks or borders for such fowl to bask upon. The whole to be made without having too much of the trap form and appearance.

The leading principles in forming a proper decoy for this use are, that, as the wild duck is an extremely shy bird, and delights in retirement, the first point should be to endeavour to make the particular space of water a peaceful retreat by suffering the ducks to rest upon it quite undisturbed. The same desire of being concealed impels them to become attached to waters, the margins of which abound with low shrubby underwood and plants of the aquatic kinds; on which account, if the particular waters be not already provided with such matters, they must be furnished with them; for it is not shade and retirement alone which entices them into such recesses, but likewise the search of food. Further, too, at certain times of the day when such wild fowl are off their feed, they are not less delighted with smooth grassy banks and margins, to pick, adjust, and oil their plumage upon; for on the close pasture-fed margins of large waters, which are frequented by wild fowl of these kinds, hundreds may oftentimes be seen indulging and amusing themselves in this manner; and perhaps nothing draws them sooner to a piece of water than proper banks of this sort; hence it becomes very essential and necessary to the success of the plan to provide a shelving, grassy, smooth, and close shaven or eaten bank at the mouth part of the passage, in order to draw the fowl, not merely to the water in general, but also to the desired part of it, yet so hidden from the sight among trees and aquatic plants that they may seem secure. The difficulties that yet remain to be overcome are those of getting the birds off the banks into the waters without their taking wing, and then leading them up the passage to the snare, or net, which is set for catching them in the most easy and natural manner. This is to be cautiously performed; and, probably, the best manner of getting them off the banks into the waters is by means of dogs which resemble the fox as much as possible, which should be trained to steal slowly from behind the screens of reeds which are placed by the sides of the narrow passages for the purpose of hiding the decoy-men, as well as their dogs, until the necessary signals be given. On thus seeing the dogs the ducks usually rush into the waters, where they naturally consider themselves safe from such annoyers, and consequently do not in general take wing.

It is necessary that among the quantities of

the wild fowls a sufficient number of tame decoy-ducks should be intermixed, which may be useful in bringing them more readily and confidently to the banks; for, as by being in the constant habit, directly on their being in the water, they make for the narrow passages, at the heads of which they have been usually fed, and found protection from the dogs. The wild ducks naturally follow, while the dogs keep driving behind, and by such means take off their attention from the decoy-traps they are entering: when as soon as the decoy-men, who are all the while looking to the proceeding through peep-holes in the reed-screens, discover that the entire shoals are under the canopy-nets, which cover and enclose the upper part of the narrow passage, they shew themselves, when the wild ducks instantly take wing; but in their flight meeting with impassable nets, instead of the natural overhangings of reeds and bulrushes, they fall again into the waters; and, being afraid to recede, the men being close behind, rush forward into the tail of the tunnel-nets, which terminate the narrow passages. In this way it may often happen that many dozens of such ducks may be taken at a single push.

This use of the narrow passage clearly shews the nature of its form. It should resemble as much as possible the outlet of a natural brook, or the natural inlet or creek of the main water. The mouth should be spacious, and quite free from any sort of confinement, that the wild duck fowls, on their first rushing into the waters, and while they have yet the power and habit of example, may be inclined to begin to follow the tame ducks; and for the same reason and purpose it should be crooked, that its inward narrowness and nets may not at first be perceived. The lower crooked part of the French horn may be considered as somewhat the best and most proper form for constructing the decoy-passage upon of any that can be proposed.

There is another material circumstance in this business, which is yet to be explained. As it is invariably the nature and habit of wild fowl of these kinds to take the wing with their heads toward the wind; therefore it is always improper to attempt to take them in a decoy, unless the wind blow down the narrow passage; for while their annoyers are to the leeward of them, they have less difficulty and distrust in going up the passage, being sure of escaping by their wings. And what is still more important, if the wind set up the passage when they take wing under the canopy nets, some of them may probably escape, which is constantly to be well guarded against; and those which fall back into the water, of course fall with their heads toward the wind, and may be with greater difficulty driven into the tunnel nets. These are points so well known to decoy-men in general, that every decoy is, where circumstances will allow of it, provided with three or four different narrow passages pointing to distinct quarters of the wind, so that no opportunity may be lost on account of its blowing from any particular point or quarter.

Such decoys as these, in such circumstances and places as have been suggested, may sometimes produce much amusement as well as large profit, where nothing could otherwise be beneficially produced either for the advantage of the owners or that of the community in general.

Section IV.—*Granivorous large Fowls and Birds, and their different Breeds and Sorts.*

These are of several sorts, but consist for the most part of the bustard, the turkey, the pea fowl, the pheasant, and the guinea fowl, and of their numerous varieties or kinds, all of which stand in need of grain or some sort of food of

that nature, or which in some measure approaches to it, in order to raise and support them in the greatest state of perfection and with the most advantage and profit to the breeder and keeper.

BUSTARD.

This is a bird of probably the largest sized land kind of any to be met with in European countries, the male of it having usually the weight of about twenty-five or six pounds. In the neck it has the length of about a foot, with nearly a foot and a half in that of the legs. It flies in rather an awkward and difficult manner. In the male kind, which is nearly as large again as the female, about the head and neck there is a sort of ash colour, while the back is transversely barred with a dark and lively rust colour. The larger quill feathers are black, but the belly parts white; and the tail consists of about twenty feathers which have broad black bars crossing them; the legs are long; and there are three thick toes in the fore part of the foot, but without any behind The male bird also differs from the female in having a sack or bag on the fore part of the neck for holding water. In the breeds, sorts, and varieties of this large bird, there are several kinds, some of which are cristed; but those which are somewhat tamed, and chiefly in use for domestic purposes, are the common and *little* sort of bustard, the latter differing solely in the size, which is not much larger than the common pheasant.

These birds were not unknown to the ancients in different parts, and in the more early periods and states of this country there were large flocks of them in the waste woody parts of many counties, as those of Cambridge, Norfolk, and Dorset, as well as in several parts of Scotland, where they were by way of diversion hunted down while young and readily taken by the greyhound. They flock together, and live to the age of nearly twenty years. The cock birds have the property of fighting with great and desperate courage and resolution until one drops or is killed. They are still to be met with in some of the former of the above districts, as well as occasionally in the shops of the metropolis and other places for sale. Their flesh is esteemed as very fine and most exquisitely delicious in the flavour, on which accounts and the largeness of their size, they would appear to be capable of being kept in the poultry yard with profit, and thereby be prevented from being wholly lost.

LAYING, SITTING, AND HATCHING.

Where curious, extraordinary, and large sized birds are objects in the poultry houses and yards, these may be bred and produced with propriety and benefit, as the flesh which they afford is so greatly valuable, and the quantity probably considerable in proportion to the amount of their keep. The stock birds for breeding, when possible, should be chosen in the same manner as those of the goose and the duck. They pair and lay rather early in the spring season, but only produce two eggs in the course of their laying, which are fully as large as those of the goose, but of a rather pale olive brown cast, set with spots of a more dark kind. The females form no nests, but making holes in the ground, they drop their eggs into them. Their time of sitting is somewhat long, being generally about five weeks. The young bustards run as soon as ever they are freed from the shell of the egg, in the manner of the young of the common fowl and those of the partridge, but are less tender, so that they require but little trouble in the early stage of their production and growth; they should, however, be

well supplied with soft grits, small wheat, haws, heath-berries, worms, and other such sorts of food, as well as fresh sand and water, and be preserved in a very clean and sweet state in all respects in the breeding-houses and places where they are kept.

FEEDING AND REARING THE YOUNG BIRDS.

As these are birds which grow to a larger size than most other kinds of poultry, they require to be somewhat more fully and carefully supplied with food from the time of their beginning to rise in their growth until they have completed it, and to be kept in more spacious and airy situations, in order to succeed in the best manner and become of the largest growth, never succeeding well with any sort of stinting or restricted keep. Their food should in some measure be such as that advised above, but combined with grain in somewhat the manner used for the turkey. By pursuing something of this manner of feeding them, they generally become fine large birds more readily and perfectly than where they are any way limited in their keep or confined too much in the houses of the fowl yards. As they eat waste animal matters without difficulty in the more grown state, they would probably be much benefited by having a little of it cut fine and mixed with the other food as they advance in their growth.

FATTENING THE GROWN BIRDS.

In the completing of this process in this sort of poultry in the most ready and effectual manner, it is necessary that the birds, from their nature and the largeness of their size, should not only be regularly and steadily, but fully fed, and that their food should be occasionally changed in its kind, as by such management the birds feed faster and more perfectly than when there is a want of regular supply in the food, and it is continued without being in any way varied. The food should be principally of the grain kind in the whole state, as that of oats, wheat, and malted barley, with a small portion of such berries as the above, and fresh sand and water in sufficient supplies. A small portion of animal food may also occasionally be found beneficial. In this manner, with a proper state of cleanness and sweetness in every thing about them, bustards may be soon made in the proper fleshy fat condition for domestic use, without any great expense in the practice or trouble in their management.

TURKEY.

This is an important and valuable bird of the poultry kind for domestic purposes, and which, in districts and places where grain prevails in much abundance, may often be raised and provided with convenience, advantage, and profit. The breeds or sorts and varieties of this fine bird which are chiefly in use here are the large black Norfolk, the coppery black, the varieties of the coppery spotted casts, and the white kinds, which latter sorts, though much esteemed and in use in different situations and places, are more tender and more liable to degenerate than the black native sort, the coppery black, or any of the copper-spotted sorts, which are by much the largest and most hardy. The white variety, which, from the redness of its head, forms so striking a contrast with the perfect whiteness of its plumage, is supposed to have been introduced from some warm country; but some of the other varieties may most probably have been the effect of intermixture and domestication.

It is difficult to say how the name of the bird arose, but it is not improbable that it might have some ludicrous origin from its consequential showy strut compared with that of the pompous solemnity of the Turk, as supported

by the false notion that these birds were natural to and first brought from hot southern climates; but it would seem that the bird was anciently wholly unknown, there being no term for it in the languages of such times.

Turkeys are birds that mostly prosper the best in rather open situations, which are dry and free from such shelter as harbour vermin that are disposed to destroy them, as they are naturally inclined to ramble. The hen turkeys, too, are often somewhat negligent of their young, so that if they have one to follow them, they never take any sort of care of the rest; it consequently becomes necessary to have much care of them while they are young, to see that they are not too much dragged about or exposed to wet and cold, as they are incapable of bearing them well and are not seldom destroyed by them. In some cases, where there are the conveniences of small thin suitable covers near the houses, they are let take their liberty, seek the places, and form their own modes of producing their young; but it is only in particular circumstances that they succeed well in such management. It has been found, on trial, that a hen turkey of the wild American coppery kind and a native cock of this country has raised a very fine breed, which bred well wild in such field covers as the above, and the produce of which always became tame when fully grown up; they were found to be a very hardy sort, and much larger than the common kind, rearing their young with less trouble and difficulty, and breeding better than the common sort. Turkeys, when kept with grain, are very great feeders, devouring it in large quantities; but when left at their liberty, and they become full grown, they can nearly, in some cases, get their own living, as they are capable of feeding much on young herbs and seeds of the nettle and different other kinds.

The aversion which the turkey cock has for any thing which has a lively red colour, is well known to most persons who have been accustomed to such birds; and they frequently follow and chase children, in such circumstances, to their great fright and dismay, but they seldom seem to intend any harm by it.

The age to which the turkey will arrive is not probably well determined, but it is in all probability less than that of the duck. The turkey, as well as the goose and the duck, is a bird which under good management may become an object of considerable use and benefit in certain circumstances of the farm system, as already noticed. The flesh of these birds is fine and close in the fibre, being white, firm, and very nourishing and good while they are young, but when old, tough and of little value.

LAYING, SITTING, HATCHING, AND REARING THE YOUNG BIRDS.

There is a difference in the raising of the young in these birds from that in those of most other sorts, as they breed without the necessity of having the male birds constantly with the females in the time of their laying season, as is usual in most other cases. The whole succession of the eggs which are to be layed at one season being impregnated by the male bird before the hen bird begins to lay. In the choice of the stock birds for breeding, a similar attention should be paid as for those of the goose and duck, with the further care, that they be from perfectly hardy and tame sorts, of a sufficiently prolific kind. In consequence of the above property, of one single or very few impregnations of the male bird, being sufficient for the whole course of a hen's laying, one cock becomes only necessary for six or more hen turkeys; and especially where it is the practice, as in Norfolk, to keep cock turkeys for their own use, as well as for that of other persons

who may send their females to them, and by that means prevent the expense of keeping male birds continually for the purpose; but as this sort of practice may be less certain than where male birds are kept in properly limited numbers, it may not be worth the trouble of attending to it, except in cases where such birds are raised on a very small scale; yet the cocks are better away at the time of sitting of the hens, as they are sometimes troublesome in forcing the hen turkeys from their nests and destroying their eggs. This circumstance should, therefore, be constantly well regarded at such seasons. As the female birds of this kind are commonly much disposed to form their nests in some hidden improper places, it is always necessary to be careful of them at such times, and to let them have proper situations, and matters by which they may be every way suitably formed. The hen turkey commonly begins to form her nest and to lay in the more early part of the vernal season, and often lays at that time, when warm and fine, more eggs than can properly be put under her, as from eleven to thirteen are quite sufficient for the purpose of being well hatched. Some prefer new eggs, as the young birds are supposed to be stronger from them. She sits, in general, from twenty-eight to thirty days, and is, in most cases, very constant in sitting, in some instances so much so, as almost to hunger herself; which, of course, renders it a good practice to let such hatching turkeys have proper food, sand, and water, constantly by them in fresh states. In consequence of this close manner of sitting, the turkey hatches her young sooner and more regularly than in other cases. When hatched, the young broods should be kept warm in the nests under the mothers, as cold in any degree hurts them, and when great soon destroys them. It is a very bad and an extremely absurd custom, however much followed by some, to take them as soon as hatched from the nests, as they cannot be kept any where so properly warm as under the hen turkeys in them; and the practice of plunging them into cold water immediately on their being hatched, is still more foolish, absurd, and hurtful, as being attended with the danger of instant destruction, and is the most ready means of causing them to take cold, when that does not happen, though the intention, if there be any in the practice, is that of preventing it, as they are very subject to such affections, which the wrapping them in wool or flannel directly afterwards by no means renders more safe, but has the contrary effect. As the young turkey brood are so particularly tender and delicate in their more early states of growth, though hardy enough afterwards, they require much constant care and attention for at least the first month or six weeks after their being hatched, as the state and circumstances of the weather may be, in order to raise them in the best and most safe manner. In the whole of this length of time, they should be kept in some well-sheltered, warm, airy, enclosed situation or place, which is as much free from any sort of wet or dampness as possible, there being convenient proper houses or places for their being put and resting in during the night-time. Here they should, from the first, be well and carefully fed with proper sorts of food, which in the beginning may be, in sufficient changes, fresh bread steeped in pure water, as milk too soon becomes sour, and injures the birds much in scouring them; newly-made cheese, or alum curd, hard-boiled eggs, and oat and barley-meal, or finely-ground malt mixed and kneaded well together, with pure water or good milk, at the same time combining with these several articles, at first and occasionally afterwards,

the giving of bruised pepper-corns, nettle-tops chopped very fine, onions or leeks in the same states, and small quantities of warm cordial seeds in very fine powder. And where there is any appearance of sickliness, from cold or the sudden changes of the weather, as shown by their drooping, and the ruffled state of many of the feathers on the birds, equal portions of ground malt and barley-meal, with a little finely-powdered coriander and cardimom-seeds, will be the most suitable, proper, and highly beneficial. To these may be added, where necessary, the strong fibrous parts of fresh-boiled meats, of which they are very fond, and which answers well both as food and in the exercise which is caused by their running after each other in their feeding on it. No sort of too liquid food is ever proper in these cases, as too much moisture in any way is destruction to all such young brood turkeys, and should, therefore, be ever carefully avoided. With these several means of feeding the birds, there should be a constant state of cleanness in every thing about them. While in this state of feeding, the old hen turkeys should be cooped daily in large coops, or by some other means enclosed in the situations as above, in proper spaces where the grass is short, fine, and well cleared of reptiles, and other such injurious animals, as being the most convenient as well as the most useful in promoting their health and growth. The cooping in this way, when the weather is fine and favourable, may be daily, for some length of time, but where it is otherwise, only for short periods, or not at all, according to circumstances; and the young brood be either confined with the old turkey, or be suffered to wander only a small distance from her. These birds are, in some cases, hatched under hens, as being more tame and less disposed to wander and drag about the young brood, but the habits of the hen are by no means suited to the turkey, and, of course, unfit to raise it.

When the young brood have been raised and managed in this manner, for such lengths of time as the above, or as are necessary, they may, by degrees, be brought to live and be supported on their natural sorts of food, as that of the different grain kinds, vegetables, sprouts, and seeds of several sorts, with the occasional use of mixed food of the meal kinds, until such times as they are rather fully grown and feathered, and become sufficiently hardy and capable of following the mothers, which, at first, should not be to too great distances, so as to over fatigue, distress, and injure them; but which is sometimes liable to happen from the old hen birds, which, though frequently affectionate and rather good nurses, are sometimes fond of strolling about and dragging their young brood, as has been seen, over the most rugged, wet, and dreary spots of the fields or commons, without ever stopping or seeming to take care of any straggling young birds, while there is one left to follow her. Neither has she the habits of scratching and working for the support of her young, but wholly leaves them to their own care and industry in getting their food. All which circumstances enforce the necessity of more attention being paid to them in their raising states. She has, however, the natural faculty of being highly vigilant and ready in the discovery of any birds of prey being hovering about that may endanger the safety of her brood, and has the means of speedily giving a certain cry, by way of alarm, which causes the young birds instantly to seek safety by running to the hedge, squatting down close on the ground, or by some other such means; but she is naturally too timid to fight and defend her brood, as is common in some other cases. The

young turkeys, in the tamed as well as in the wild state, have the power of running with much speed to considerable distances, and also the disposition of getting into high trees and other such situations, where they would prefer roosting, in the warm seasons, if it could be permitted by their safety.

In the grown state, the turkey, in either the extended range, or the more limited farm, or large poultry-yard manner of raising them, will commonly succeed well; as, in the former method, they will mostly provide for themselves through the day, and only require to be well fed, with grain, or mixed food of some proper sort, at their going out in the mornings and on their return in the evenings; and in the latter mode, they must be well fed with such food in the same manner as the other poultry, in most cases.

Thus, in these methods, with proper and sufficient care and attention, which always ultimately give the least inconvenience and trouble, the turkey, which is the most tender and difficult in rearing of any of the domestic birds of the poultry yard, may be raised and provided in sufficient ample abundance, and almost without loss, as it is from ignorance, carelessness, and the want of sufficient attention, that so much loss has often been sustained in the breeding and raising of these valuable and greatly-esteemed birds.

Other methods, which are in some respects different, are said to be practised in some situations and parts where fine turkeys are raised to much advantage and in great plenty with little loss, difficulty, or expense, in which they have given to them when just hatched a corn or two of some warm substance, such as allspice, then continuing the feeding and rearing of them for the few first days with the curd formed by boiling milk and egg together, and letting them have suitable small portions of it two, three, or more times in the day; after which for about a fortnight longer the quantity of egg in the curd being increased, and a small portion of the meal of oats added, they have that and a small supply of the most stinging sort of nettles made very fine by shredding, which are supposed from their sharp stimulating nature to be very material in the early feeding and raising young birds of this sort. Afterwards, when they have attained some weeks farther growth, they have milk or buttermilk, with a more full supply of fine shred nettles, and some meal of the above kind, mixed into a sort of paste. In this manner it is conceived turkeys may be fed and kept until they are fine large birds fit to turn into the stubbles. As almost every thing depends, as has been seen, on regular warmth and proper care in the very early management, in raising such birds, it is not improbable that this mode of rearing young turkeys may be found to have advantage in the cheapness, as well as the success which may attend it.

In breeding and raising turkeys, some suppose that there is advantage derived from mixing the breeds, especially those of the copper-coloured kinds, and such as are the least removed from the wild state, as they are less disposed to leave their young, less affected by cold, and more careful and steady nurses, producing a more hardy offspring. The intermixing of the white breed with those of other sorts seems, however, to have had a contrary effect, not only in rendering the whole of the breeds more tender and delicate, but in causing them to be inferior in the quality of their flesh. Therefore, the unmixed or mixed hardy sorts are always to be preferred for the breeding of these birds. In raising turkeys there is also advantage supposed to arise from having

not too young hens, as they are better and more steady nurses.

FATTENING THE GROWN TURKEYS.

Where these birds are put up, prevented from wandering, and fully fed in a regular steady manner, they may be made fat and in the most proper condition as food, with much more readiness and despatch than is commonly supposed by any proper sort of food. But oats, buck-wheat, barley, and malt, or their different meals in mixture by means of pure water, with a due proportion of chopped nettles, onions, or leeks, are the most forcing sorts of food for the purpose, and those by which they may be the most expeditiously and cheaply fattened in the confined state where they are properly given and sufficiently varied. Where other meals are united with that of the roasted or boiled potato kind, which is a good and cheap sort of food in such intention, they should be mixed up quite fresh and fresh with water, as milk, which is better when the food is used directly, when kept but even for a little time gets sour, and causes the whole to become so, and to scour the birds too much; as they should always be in the rather constipated state while they are undergoing the process of fattening.

CRAMMING.

Besides these methods, which are probably the best and most ready, turkeys are fattened or fed out occasionally by means of cramming or stuffing them with a larger quantity of forcing food than the stomach can naturally take in, and convert into nourishment; consequently, there is much waste committed, as the over quantity is solely passed away in the excrement of the bird. The practice is, therefore, not only cruel, but greatly wasteful and of little or no avail, as it is well known to those who have the least notion of the nature of the animal economy, that not a particle more of the food which is eaten, or in any way forced into the stomach can be of service in feeding or fattening, than that which is capable of being digested and converted into chyle, which is the nourishing and fattening fluid, by means of the stomach, whatever the quantity may be that is forced into it. But, besides, there is not a necessity for it, except where the stomach is disordered, as the birds will generally consume it fast enough, and in sufficiently full quantities, without being forced with it, where they are kept constantly fed in a sufficiently varied manner, and properly supplied with fresh portions of sandy matters. Where, however, the practice is had recourse to, a paste made of barley or some other such meal with pot-liquor or common water is made use of for the purpose, being formed into a small ball the size of a small walnut, which, on the bill being opened, is thrust into the throat, and gently stroked down; the operation being repeated until the crop becomes sufficiently full: from which the bird is induced to become quiet, and perhaps to sleep, which are productive of the good effects, if there be any in the practice.

STUBBLE FEEDING.

Turkeys, too, are brought into high condition, in many cases, by picking up the waste grain of the corn-fields in the same manner as geese; and by running over and collecting food in the woods and large commons on the approach of the winter season, being afterwards merely put up for a week or two, to be fattened out by such additional fattening keep, as has been advised above.

In some principal districts, especially that of Norfolk, so famed for its turkeys, they are said to be sometimes fattened each to the weight of twenty and even thirty pounds, but the most usual weights of them in these states

are from about sixteen to twenty pounds. The wild turkey of America has, however, been asserted on authority to have reached the extraordinary weight of more than fifty pounds, but which is scarcely to be believed. The difference between the living and dead weight of the fully grown and fed turkey here has been stated to be this:

Live weight, 21lb. Dead weight, 14lb.

The fineness of the flavour in the flesh of the Norfolk turkey has been supposed to depend upon the dryness of the soil in that district, and the extensiveness of the ranges which they are permitted to have in their young growing states; but it is more probable that it proceeds from the larger quantity of corn which is employed in their keep during the whole of their growth and fattening processes.

The turkey is the most conveniently killed by opening the bill, and cutting with a sharp-pointed pen-knife the rings or risings of the roof of the upper mandible, and the blood-vessels under the root of the tongue, hanging the bird up by tying the feet together.

PEA FOWL.

These fowls are birds of very great beauty, but especially the male, or peacock, which was well known to the ancients, who selected and favoured it in consequence of the great dignity and grandeur of its demeanour and the gorgeousness and great brilliancy of its plumage and fine spreading tail of divers colours, and beset equidistantly with a sort of eye-like appearances of the most beautiful cast. On the head there is a little tuft or crown, and on the wings a mixture of azure and gold. It is not improbable that these birds were anciently as well as at present introduced to the table somewhat more for the purpose of pomp, show, and ornament, than as an article of food to be eaten.

It is unquestionable, however, that they were carefully fed and fattened for the feasts of the rich and luxurious then, as well as of old, for the Christmas festivities in this country. Yet, though there may be a delicateness and fineness in the flavour of the flesh, which somewhat approaches that of the best game birds, in the young pea-fowl, it is certain, that when grown old it is extremely tough, hard, dark in the colour, and but very indifferent eating. With the ancients, notwithstanding, when they had been once served up at public feasts, they were afterwards constantly considered as one of the greatest luxuries and ornaments of them. How far the ancient modes of cooking in other parts, as well as this, which was more high than that now used, probably, in both, might have rendered them more agreeable to the palate, it is undoubted that the peacock was esteemed the first of food of the flesh kind. This famed delicacy and goodness of its flesh did not, however, continue in high estimation long, as it was soon the custom to serve up the birds to the tables of the great, not as an article to be eaten, but as only to be seen. The manner in which this was effected was that of stripping off the skin, and then preparing the body-parts with the warmest and most preserving spices, when they were covered up again by the same skin with all the plumage in full display, without being in any way injured in the preparation. The bird thus made ready was often preserved for several years in a state of perfect freedom from corrupting; and it is commonly supposed that without this preparation, the flesh of it is capable of keeping longer in a sound state than that of any other kind. In

order to give a higher gratification to such feastings on particular occasions, it was also customary to fill the beak and throat of the bird with cotton and camphor, which was set on fire to amaze and delight those who attended.

Besides the common breed of these birds, there are varieties which are white, others that are crested; but that which is of the *Thibet* kind is said to be the most beautiful bird of the whole feathered creation, containing in its plumage each of the five most vivid colours, red, purple, blue, yellow, and green, disposed somewhat artificially, as if it were merely to please and delight the eye of the beholder.

It is a vulgar saying, in some places, that this bird has the plumage of the angel, the voice of the devil, and the internal parts of the thief, which in some measure, indeed, well mark the nature and qualities of it, as, when its tail is fully expanded, there is no other bird which can vie with it for beauty; but the dreadful and horrid scream of its voice greatly lessens the pleasure of seeing it; while its insatiate gluttony and habit of mischief, render it one of the most destructive birds that has been tamed and protected by man; for, in the indulgence of its capricious appetites, walls cannot easily restrain or confine it, the tiles or thatch on the tops of houses are stripped by it, the labours of the gardener laid waste, the choicest seeds and most favourite flowers are rooted up and nipped in their bud, so that the beauty of its plumage but ill recompenses the injuries it occasions, which causes many less fine looking birds of the fowl kind to be justly preferred to it.

It is a bird which lives to the age of about twenty years; but it is not until the third year that it has that beautifully-diversified plumage which adorns its expanded tail.

This is a sort of bird which, exclusive of the ornament which it gives to the poultry-yard, may however, in many cases, be greatly useful in destroying insects and reptiles of most kinds, but care must always be taken that it does not commit its ravages on the young turkeys, ducklings, chickens, and other such broods, as it is not unfrequently viciously inclined in this way when they are permitted to be too much within its reach; but it should, for the most part, be restricted to some particular part of poultry-yards, which are capable of being occasionally made distinct and separate from them, and have suitable conveniences for them, as by these means it will be incapable of doing mischief to such young broods in the breeding seasons, when they are just hatched.

LAYING, SITTING, HATCHING, AND REARING, THE YOUNG.

In the breeding of pea-fowls, there is a necessity for selecting as stock those of such sorts or varieties as are intended to be bred from, that have the finest plumage, are the largest, plumpest, and best grown birds, and which have the greatest degree of tameness and domestication, pairing the hen and the cock well together, as by such means the best birds for domestic use may be produced. These birds are commonly kept by the dealers in such sorts of stock in most large towns, and especially in the metropolis, where they may generally be met with, and provided in sufficient abundance for the use of breeding. One cock is mostly sufficient for three or four pea-hens; and in their native forests, where the food and climate particularly suit them, and they breed naturally, they are greatly prolific; but in this the pea-hen rarely lays more than from about

five or six to seven or eight eggs before she is inclined to sit. She is always carefully secret in making her nest in some safe place. The eggs are about the size of those of the turkey and the pheasant, and the female bird sits and hatches in about the same length of time. While sitting, the pea-hen secludes herself as much as possible, and when the young brood are brought forth she keeps very carefully from being seen by the cock, as he would otherwise destroy the eggs if the nest were found, and the young pea-fowls too when that was not the case. On these accounts she commonly, when it can be done, has her nest in, and keeps near to, some close thick covering matters of the tree, shrub, or other such kinds. The young seem to require little feeding or attention at first in raising them, as the pea-hen and her young brood are rarely much seen until such time as the latter are become of a properly strong growth. The young birds soon run, and get such strong growths, but they must afterwards be kept to the hen, so as to have her warmth, and be in some properly airy warm place in this early state, until they become of sufficient growth and strength to go fully about and feed with the mother, their food in this stage, and until fully reared, being insects, small reptiles, tender herbs and buds of different kinds, with a portion of good grain of the barley or malt kind, which they most desire, and sometimes a mixture of their meals with that of oats by means of water, as they thus not only proceed better in their thriving, but have the habit of liking their food to be as much varied as possible, which is of much consequence in their successful rearing. It is seldom that more than a few birds, as two or three, are reared at one hatching in this climate, except in very warm suitable situations.

By some persons, the flesh of the old pea-hen is considered as fine, but it is dark in the colour and somewhat hard. The young hen pea-fowls are by much the best as food, and may occasionally be made use of in that way with novelty, and are no indifferent sort of dish when properly cooked by the higher kinds of seasoning.

PHEASANTS.

Pheasants are birds which may be said to stand next in beauty to those of the peacock sort in the liveliness, fineness, and showiness, as well as the diversity of their feathery coverings; as there is not any thing probably that can more satisfy the eye with higher degrees of variety and richness of ornamental colouring than them. They have the iris of the eye yellow, the eyes themselves being surrounded with a scarlet colour, spotted with little specks of black. There are feathers of a blackish tint, on the fore part of the head, blended with those of a shining purple hue. The upper part of the neck and top of the head are tinged with a darkish green that shines in the manner of silk; but in some, the latter is of a shining blue, while the head itself, with the higher part of the neck, are occasionally blue or green, as they are differently exposed to the eye of the beholder. On the breast, the shoulders, the middle part of the back, and the sides beneath the wings, the feathers have a sort of blackish ground, the edges being exquisitely tinted, so as occasionally to appear black or purple, as the difference of the light may be; and there is a transverse streak of gold colour under the purple. The tail has about eighteen inches in its length, from the ends of the middle feathers to the root of it. There is a sort of horn colour in the legs, the feet, and the toes, the first having black spurs shorter than those of the common cock; and there is a membranous expansion connecting two of the toes to each other: the male

bird is much more beautiful than the female in this as well as the former case.

These birds are seldom made perfectly tame by means of domestication, as they still retain something of their native independence; nor is their flesh supposed to be so good when raised under confinement as in the wild state, though the difference is probably not so great as is often conceived, but they are birds which are rarely in such condition in the confined as the tame state. They are on these accounts but on few occasions kept in this intention, being more frequently had recourse to for the fine ornamental effect which they have, or that of providing them for other situations where they are to be kept wild. The pheasant becomes in the perfect state in the autumnal season, when the flesh of it is considered as highly delicious, having a high game flavour and wholesome easily digesting quality, especially when young and well fed.

There are many breeds, sorts, or varieties of these birds, as the common sort of this country, which is mostly brown and less brilliant in its feathery covering, but hardy and large in size; the gold and silver sorts, both of which are said to be good breeders and hardy in this climate, though natives of the East, the former highest in price, as being the most rarely procured; the ring-necks, which have a very beautiful plumage, but are scarce, being raised in the East, and natives of Tartary; the white and pied sorts, both of which may be readily united with the common brown breed or sort of this country; and the Bohemian sort, which is scarce, but highly beautiful and capable of intermixing with the brown common kind.

How far the produce between the pheasant and the hen may be usefully raised, has not yet probably been sufficiently tried; but they may be so raised in the least difficult manner, perhaps, by confining rather grown cock pheasants with any of the sorts of young hens of the same growth, and letting them be kept rather well with grain of the barley kind and their native sorts of food.

These sorts of birds are not long lived, but they may probably live eight or ten years, though they have been supposed to have a much shorter continuance of life by some naturalists.

The cocks of these kinds of birds are said to have much boldness, voraciousness, and cruelty, as they have been discovered to prey on dead animal matters, destroy weak birds, and even the feeble young of their own kind. They have the habit of feeding on most sorts of insects and creeping vermin, as in the case of the peacock, and are considered as extremely greedy of young toads, while they wholly reject the frog, which is so eagerly sought after and fed on by some fowls, as the duck.

LAYING, SITTING, HATCHING, AND REARING THE YOUNG.

In selecting breeding stock of this kind the finest, largest, and best formed of the several sorts should be fixed upon, taking them, when it can be done, from such as have been confined while in the young state and are become somewhat familiar. They should then be put together into a fresh proper spacious enclosed place where there is sufficient cover for concealing and protecting them, in the proportion of not more than four hen pheasants to one cock; and where they are raised in out-covers, one hen less may often be a full allowance, even in the chance of one being lost. The nest of the pheasant in the natural state is formed of dried grasses and leaves, which, if placed for her in the confined state, she will in some cases put in proper order for herself. The hen of this kind lays a number of eggs, as from fifteen to twenty in a season when in the wild state,

but rarely more than half the quantity when in a confined situation. Though pheasant hens may be good nurses in the wild condition, they are mostly very different in enclosed states; for which reason their eggs are usually hatched in such cases by some of the common hen kind, as the mixed bantam, or any other close-sitting sort; yet hen pheasants of the common sort in such situations, when there is abundant cover for them, will occasionally form their nests and hatch their own eggs, though they are rarely successful in raising their young broods in consequence of their natural shyness; on which account, where such a mode is to be pursued, they are to be wholly left to themselves, as they feel disturbed by being simply looked upon. The eggs for setting the hens with are commonly ready about the middle of the month of April, which should be quite fresh and have been well kept, and not more be put under one hen than she can completely and closely sit on and cover. They are best placed under hens which have kept to their nests some days; and when several hens are set at the same time, it will afford the means of changing them as may be necessary; when, after a little while, it will be useful and proper to displace such as are not proper, and reset the same hens where there is a scarcity of good sitting ones. After the hens have sat their full length of time, which is the same as that of the common hen, some advise that such of the young brood as have been first hatched should be taken away into a small basket and be wrapped in flannel until such time as the rest have been produced; but it is a much better and more natural practice to leave them in the nest with the hen, as the warmth which they thereby gain is so highly suitable and beneficial to them that they cannot receive the same advantage in any other way, and the same principle equally applies to all such young hatching broods, as more such young of different kinds are destroyed by their early removal than by any other cause whatever.

As soon as the whole brood have been hatched and are become properly strong, they should be put under a sufficiently spacious frame, which has a net over it, a place being formed for containing the hen, by which she may be prevented from getting to the young pheasant brood, while they have the ready means of getting to her. Here they must at first be carefully and very regularly and exactly fed, with a little of each of these sorts of food at a time frequently given them; milk and bread well boiled together, boiled egg chopped small, ant's eggs, and alum curd. A small portion of the last, which is made by boiling new milk with a small piece of alum, in such a manner as not to render it hard and tough, but custardy, may be given twice in the day, and a few ants'-eggs after each time of feeding with the other sorts of food, so as to keep the appetite in a proper state, but not in any way as the common food; the curd being always prepared fresh and fresh. And as variety is useful and necessary in feeding and rearing such birds, wood-lice, earwigs, or other such insects, with small granulated portions of fine flour, wrought up with egg and shell altogether, may be occasionally had recourse to with propriety and convenience. When, after feeding the young brood in this manner for the first three weeks or more, in case ants'-eggs cannot be easily provided, a few gentles, produced by tying up a liver or some other animal matter, and letting them drop into a pot and be cleared by bran, may be given in a sparing manner, without intending them as the common food. In every thing the strictest attention should be paid to cleanliness and sweet-

ness, so that there may be a perfect ventilation in the enclosed places, and a pureness in the food and water, the latter of which should be changed twice or three times in the day.

In most cases, after the first few days, the young broods become well accustomed to the calls of the hens that hatched them, when they may be suffered to run, in fine days, on adjoining plats of short close grass, or other such places, care being constantly taken to have them shifted to the sun, and well sheltered from cold winds; but they are not to be put out in the mornings until the dew is dried up by the sun, and always be taken in to the hen while the sun is up in the evening. Such broods as are short or small in number are best when united and put to a single hen, as it saves trouble and expense.

In these methods of management, while the rearing of the birds is proceeding in a properly favourable and successful manner, it is extremely necessary to be careful in guarding against a diseased state of somewhat the roup kind, to which they are greatly subject, and which is more dangerous than all their other enemies put together, by choosing proper and suitable situations, as those where no other sorts of birds of the poultry or other such kinds have ever been kept, for the purpose of breeding up and rearing the birds fully in; as the sides of paddocks exposed fully to the sun that join the places where they are hatched, open lawns, large grass-plats in gardens, or warm dry commons, near woody covers, and by the sides of dry sheltered woods; in which last cases a person must constantly attend them well armed, and prepared for keeping away vermin of every kind.

The young birds, in the above progressive manner of their being raised, are to be so continued, when very early bred, until the middle part of August, and when hatched later, until the following month; but until such time as they begin to shift the long feathers in their tails, they are to be regularly enclosed nightly with the hens; however, after that begins to take place, they are become so large as to be unwilling to be enclosed with the nurse hens, and, consequently, endeavour to remain out, which is proper and natural, and without being injurious when the weather is fine; but in wet seasons they are better enclosed a little longer for protection, without being put to the hens. All those birds which are designed to be turned out wild are now to be trained to the use of the perch, to which they have not before been accustomed, but which may be effected by assiduously constraining the hens to sit during the nights in trees proper for the purpose, by which the young pheasants will follow the example of the hens and perch near them. After which they will readily provide for themselves, as there will be plenty of suitable food in readiness for their use.

But for such of the young pheasants as are intended for breeding-stock in the enclosed domestic state, or for being turned out in the following spring, it is necessary that a properly large spot of ground, which is roomy enough for two enclosures, should be provided, where there has never been any such birds kept before, into which they are to be put and confined just as they begin to shift their tails. Such of them as are designed for the latter purpose, are to be put into one of the enclosed pens which is netted over, their wings being left in their natural state; and those which are intended for the former use are to be put into the other of the enclosed pens, one wing of each bird being clipped properly short, to prevent their escape. When the birds are of the gold or silver breeds, they should be put in earlier, as

they will be liable to be sooner gone away. The wings are to be kept constantly clipped in a proper manner. All the young birds, when first enclosed,, should be well fed with meal paste of the barley kind, dough, grain, and full quantities of greens of the turnip-top or other such kinds, and afterwards have full supplies of barley and oats, which are their favourite sorts of food, with those of the insect, herb, and bud kinds.

For the full-grown pheasants, besides their natural sorts of herb and insect food, they must have grain of the barley, wheat, or oat kinds, with hemp and other stimulating seeds, when the breeding season is cold and damp as they promote the laying of the birds in a very beneficial manner. In the fattening of such birds, they must have plenty of such sorts of grain as the above, in variety with their meal-pastes, in due mixture.

It was long supposed, that the breeding and raising of these sorts of birds could not be effected to any extent, for want of the necessary insect food, but in the above manner, which is probably nearly that to which the best pheasant-breeders about the metropolis have recourse, and by which they breed and rear some hundreds in the course of a season, they may be provided in very large quantities without any great difficulty, expense, or trouble.

GUINEA FOWLS.

These fowls are curious in their nature, being considered as in some degree possessing the united distinguishing qualities of the pheasant and the turkey, having the delicate fineness of shape of the one, and the bareness of the head of the other. They are somewhat of the size of the larger sorts of the common hen, but as being high in the legs they seem larger. The back is rounded, with the tail short and turned down, as in the partridge. The head is incased in a sort of helmet, there being wattles under the bill, which are not produced from the under chap, as in the common cock, but from the upper, which give it a very singular appearance. The whole of the plumage is a fine blue, or darkish grey, sometimes spotted with white, and their gait and chuckling cry are peculiar. In their nature they are rather wild, appearing not wholly domesticated. They are restless, active, and fierce, so as to make attacks on birds much larger than themselves. In their habits and nature of feeding, they have much similarity to the common fowl of the hen kind, but they have this distinguishing circumstance, that the cock and the hen are so much alike, that it is with difficulty their difference can be ascertained, and which is only known by the variation of the colour in the wattles, which, in the male bird, have a bluish cast, while in the female they are more inclining to the red tinge. There seems to be no difference of breeds or varieties in this bird, as there is a perfect sameness in the whole race.

The flesh of these birds is excellent as food, having a near approach to that of the pheasant in its flavour, and what renders it still more desirable is, that of its coming in for use when the season for game is towards its termination. They are, consequently, birds which may be kept with greater use and profit, in many situations, than many of the other poultry kinds; for the silly notion maintained by some of the male birds dying in consequence of a small horny substance being thrown out upon the tops of their heads, has no foundation whatever for its truth.

The length of time these birds will live is, probably, much the same as that of the common hen fowl.

LAYING, SITTING, HATCHING, AND REARING THE YOUNG.

In providing breeding stock of this kind, those birds which are healthy, strong, well and fully made, large in their size, and the most tame in their nature, should be preferred. One cock to five or six hens being quite sufficient, as in the common fowl kind. As they are shy birds, they usually, where it is possible, form their nests in hidden places, as among tall weeds and nettles, or in the bottoms of hedges and thick bushes, where their eggs are often in danger of being lost or destroyed. It should, therefore, be cautiously observed where they go to lay. They usually lay a very large number of eggs in the spring and summer seasons, many more than are necessary for or can be sat upon, which, as they are excellent in their quality for most uses, they should be carefully preserved, but such as the hens of this sort are to be set with, where it can be done, should be quite fresh, as well as those used under common hens; but the former not unusually bring forth their young in their own natural manner, though it is often supposed they will not hatch their young, as they are such a great length of time in laying their complete course of eggs before they become disposed to sit. On this account, it is frequently a good and convenient practice, to have their new-laid eggs covered and hatched by such of the common hens as are good sitters, as the young produce are not more difficult or tender in being thus raised than their own chickens, and they have much the same habits and modes of feeding. The time of sitting before the eggs are hatched is about a month, and when these birds sit and hatch their own eggs, they must not be the least in any way interrupted, as the slightest disturbance causes them, in many cases, to forsake their nests. As soon as the young brood are brought forth, and sufficiently strong to run about with their mother, they must be fed for the first ten days or fortnight with good wheaten bread soaked in pure water, rice similarly steeped, and a few moistened grits, two or three times in the day, having a small portion of solid grain with these substances as they advance in their growth, and afterwards the usual good keep which is made use of for common hen fowls, with such seeds and insects as they can pick up. By these means these birds may be reared in a perfect manner, with but little trouble or expense.

When full grown they may be fed and fattened in the same manner, and by the same sorts of food, as the common hen fowls, having the weight of from four to five pounds and upwards, being sold when alive for about three shillings a-piece in most large towns, and, when well fattened and prepared for being used as food, at from eight to ten shillings each in many cases.

SECTION V.—*Gallinaceous Fowls, or Birds of the Hen kinds, and their several Breeds, Sorts, and Varieties.*

THESE consist of the cock and the hen, and of their several different breeds, varieties, or sorts, most of which will eat fish and other animal matters, though their natural food is grain, seeds, and other such matters, and without which they cannot be brought to the most perfect state, or be kept in the most beneficial or profitable manner.

COCK AND HEN.

These are birds which have large bulky body parts, and but small limbs and heads, their flesh being fine, white, and delicate in the flavour, with a great facility and readiness of digestion.

They are provided with short strong beaks, by which they are enabled to pick up and eat hard grain readily. They have the wings short and rounded outwardly, which causes them to fly with difficulty. The male takes but little heed of his offspring, leaving the care of providing for the future to the female, who has the whole labour and trouble of hatching and rearing the young, choosing a place, for the purpose as remote and retired from him as possible, taking very little pains in forming her nest, as the young brood so soon leave it after being hatched, and pick up their food for themselves. With their other habits, these birds in particular, have that of dusting themselves, by lying flat down where dust prevails, and by their wings and feet raising and scattering it over their whole bodies. The cock, though extremely bold and daring when among or opposed to those of his own kind, is rendered quite tame and affrighted by birds of prey. His extraordinary salaciousness soon exhausts and wears him out, and in three, four, or five years, he becomes quite unfit for use. The hen, likewise, in the course of not many years, becomes improper for production. She is mostly in the greatest perfection about the third year of her age, and begins to decline after the fourth or fifth, on which account, it is commonly improper and disadvantageous to keep her longer for the purpose of production, unless she have some particular good qualities. She rarely raises more than one, but sometimes two broods of chickens in a season. The proper time for sitting and hatching her young is testified by her clucking note, and the discontinuance of laying. She lays a very great number of eggs, when she has plenty of air and exercise, is well fed with proper sorts of forcing food, and the eggs are regularly taken away from her; but otherwise, probably would seldom lay more than were wanted for being hatched before she became disposed to sit. In this act her patience and perseverance are often extraordinary, as continuing almost immoveable for days, and when impelled to leave her nest by hunger, she returns with the least possible delay. She has also the habit of turning and altering the position of her eggs in the nest. When the increasing vitality and growth of the chicken, produced by the heat and nourishment which is afforded, bursts the shell of the egg, and sets it at liberty, the hen continues to sit until the whole of the brood are excluded; the strongest and most perfect the first, the weaker and less perfect afterwards, the very feeble and imperfect often perishing before they are liberated from the shell. As soon as the whole are produced, she looses little time in leading them forth to pick up their food and provide for themselves. Her nature and habits at this time suffer a considerable change, as instead of her voraciousness and cowardice, she refrains from all sorts of food that can be eaten by her young, and promptly flies with boldness at whatever is likely to injure or any way hurt them, whether men, dogs, or any other animals. When at the head of her little flock, she has a variety of peculiar notes by which she directs them to their food, or warns them of impending danger.

As but a very few chickens can be raised and brooded over at a time by the hen in proportion to the great number of eggs which is sometimes laid, different artificial means of hatching the whole quantity, and thus turning the produce of hens to the best account, perhaps, in some cases, have been tried, such as by heated stoves, ovens, or *mamals*, as practised in a district near Grand Cairo in Egypt, where many thousands of chickens are hatched at the same time, which, from the very high degree

of warmth which prevails there during the spring months, thrive well, and are easily raised without any other means being used;—by graduated fire-heat communicated in different other ways;—and by the heat which is evolved during the process of fermentation by the stable dungy and littery matter; but though the little chick may here be easily brought into life by any of such means, in consequence of the sudden cold and changeable states of the weather in the breeding seasons, they must inevitably be destroyed on their exclusion from the shell of the egg, as no possible method would seem capable of being contrived of sufficiently brooding, protecting, and keeping them constantly in that state of warmth which is necessary for the successful rearing of them. Besides, in many cases, there would be an impossibility of getting any large number of properly fresh eggs for the purpose, and there can mostly be sufficient supplies of such poultry raised in the common natural method without having recourse to such troublesome means. But it is not improbable that considerable facility and advantage, as has been seen above, might be gained in hatching and rearing chickens in the common manner by the use of properly heated and graduated walls on the back parts of the low ranges of the divided breeding-houses which are proper and essentially necessary, in all such cases, where any large stock is to be kept. These would be extremely useful in cold early as well as backward spring seasons, and, where well managed, save much of the destruction of such young broods caused by the severity of the weather at such periods, besides being beneficial in promoting the more early laying of the hens.

In consequence of these birds having been so long familiar with, and under the dominion of mankind, they display very great variety and differences in their forms, sizes, and the colours of their feathery coverings. How long they will live has not probably been well ascertained, but it has been supposed to be about eight or ten years.

BREEDS OR SORTS AND VARIETIES.

The breeds or sorts and varieties of these fowls which are principally in use for domestic purposes are, the *game* breed or kind, which have a most beautiful red plumage, are rather below the common size, but fine and delicately formed in their different parts, with the flesh extremely white and beautiful, being richer and more delicate in the flavour than that of any other breed; they lay well, their eggs being very fine, though rather less in size than those of some other sorts; but they have the early disposition of fighting, which renders them difficult and troublesome in raising, the same disposition in some measure prevailing in the half-bred sort, which renders the use of the cock of this breed improper, otherwise much improvement might be gained in many cases:—the *English* common or dunghill breed, which are larger in size, and of a more lengthy form in the body part, having almost every kind of colour in their feathery covering, and being useful both as layers and breeders from their great productiveness:—the *Dorking* breed, which are the next in largeness of size, and probably so named from that town, about which they were most likely originally produced, are of a good shape, with still more length and capaciousness of the body, being short in the legs, and the true colour in general entirely white; they are valuable as plentiful layers; but neither the whiteness of their plumage, nor the tinge of their flesh are perhaps quite so pure as in some of the dunghill kinds, the latter having a yellowish cast: they are that sort which are commonly cut and fed up as capons, having in

the original breed or sort, the distinction of five claws on each foot; but in the neighbouring district of Sussex they are said to have a large breed of this sort without the fifth claw, which is considered in no way as their primary distinguishing circumstance, but merely as chance production, and denoting a faulty sort; it is not unlikely, however, that it may have been produced from some mixture of the Dorking with other sorts; the fifth claw being lost in time in consequence of the more full use of male birds of other kinds which had no such parts, as often happens in other cases of breeding domestic animals; there is, however, nothing which tends in the least to cause harm or inconvenience in such an additional part, as it neither loads the foot nor causes the removal of the eggs, as sometimes supposed:—the *Poland* breed, which, though so named, were at first, it is said, principally brought from Holland, are full, deep, and plump, in their form, with not too great length of legs in the most perfect sort; the colour of their plumage a glossy black, the head being set with a white or black top or tuft in both the male and female; it is flat, and surmounted by a fleshy protuberance, from which rises the feathery crown in a somewhat spiked manner; the breed is less thickly provided with feathers and down than that of some others, and very ornamental, while at the same time it is highly beneficial in the large quantity of eggs that are laid, being less inclined to sit than any other sort, on which account such hens have often been said to be *everlasting* layers, their eggs being usually set under those of other kinds; they fatten with equal readiness as those of any other sort, and in the quality of their flesh are probably somewhat more rich in flavour and more juicy than the preceding sort; the tufts on their heads require to be cut occasionally to prevent their eyes being inconvenienced by them:—the *Shackbag* breed, which is a large sort, but now, unfortunately, nearly or wholly lost, having the flesh fine in quality and white in appearance, the plumage of various colours, but often red. The former Duke of Leeds being a great admirer of the breed, it was frequently called by his name; but how it arose is quite uncertain. However, it was an useful large sort for many purposes; but by attempting to preserve the perfect fullness of size in it by the use of Malay hens, a mixed breed was produced, but the appearance and fineness of flavour of the flesh wholly destroyed:—the *Malay* breed, which is very large, having the neck long, the head somewhat flat, high in the leg, yellow striped in the colour, the flesh coarse and not so fine coloured as in other sorts, but very productive in eggs, which are of the largest size, and highly nourishing in their quality; yet, on account of the length of leg, not good sitters:—and the *Spanish* breed, which has much largeness in the size, and the colour black, the flesh being white and fine, and the eggs of the large kind. A breed of very large size has been raised by the use of cocks of this breed and hens of the best-sized Dorking kind, which are well suited for being cut and fed as capons.

There are also other large sized breeds, as the *Hamborough* breed, which from the belly and thigh parts having a soft black velvety appearance, is not unfrequently termed *velvet breeches*. It is a very large sort and in frequent use for the table on many occasions. The *Paduan* breed is likewise of a great size, and often distinguished and much esteemed on that account. The *frizzled Asiatic* breed, in which the feathers are curled and crumpled up in such a manner as apparently to stand in various

directions, yet as being originally the produce of a hot climate, are very tender and sensible of cold while in the young state; but they have a curious and extraordinary appearance, and are held in great estimation for the use of the table. The *Persian* breed, which has neither rump nor, of course, tail feathers, though they are somewhat tender in raising, are excellent as food. The *silk* breed, in which the skin and bones are of a black colour, and the feathers have the resemblance of hairs. They are curious, but less fine for the purpose of eating, in consequence of the cast of the skin. In the *crested* breed there are several varieties, as the black with white crests, the white with black crests; the silver and gold ones, and some others; but they are all, besides being ornamental, useful as food. There is also a speckled breed or sort from Holland, termed *duck-legged* hens, which are well formed and good layers, being favourable in raising full broods of chickens.

Besides these large breeds and varieties, there is the *dwarf*, *bantam*, or *Indian* breed, which is but small, though a very spirited sort, having not more than half the size of the game breed, which it somewhat resembles in colour and habits. In the cock the bill is reddish, with red eyes, there being a curious rose-like comb on the top of the head, and the ears are covered with tufts of white feathers; the neck and back are laid with long feathers, which have the orange, black, and yellow colours intermixed; and the breast and lower part of the belly are black. The hen chiefly differs in having the colour more varying with brown and yellow and less of the black, the red comb on the top of the head but small; the legs in both the cock and hen are fully feathered quite down to the toes, which is a principal distinguishing mark of the true breed. This little breed, besides being curious, is valuable for the great produce in eggs and chickens, and for the quality of the flesh, which is probably next to that of the game breed in the fineness of the flavour.

A variety of this sort has of late been raised, which is still smaller and quite smooth in the leg, and which, from the smallness and fineness of the flesh, may be of much use in many cases as a substitute for small young fowls of other kinds when they are scarce or not readily to be had. They may also be valuable in other respects, as they are not only good layers, but excellent sitters and nurses, either with their own eggs or those of other hens and birds.

Section VI.—*Choosing proper breeding Stock, and the Methods of raising, feeding, and fattening their Produce in the best manner in different cases.*

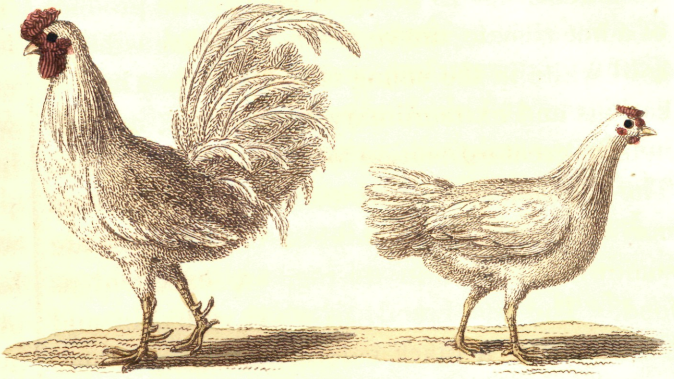
Whatever the sorts of such stock may be, the choice of them should always be well and nicely attended to, as much in raising them depends upon it. The usual kinds of this sort of stock may be provided without difficulty in most places, and the particular curious sorts are in general to be met with at the dealers in such sorts of poultry in most large towns.

The healthy state and condition of all kinds of fowls are known by the combs having a fresh and florid colour, and the eyes being bright and dry, and their being without any sort of discharge from the nostrils, while the plumage is of a fine glossy appearance. The advanced and declining states of them are shewn by the gills and combs being more pale and dull in their colour, the feathers having a kind of imperfect stiffness, and the claws being of greater length and size than common, while the legs

Breeds of the Poultry & Water Fowl kinds.



Game.



English or Dunghill.



Poland.

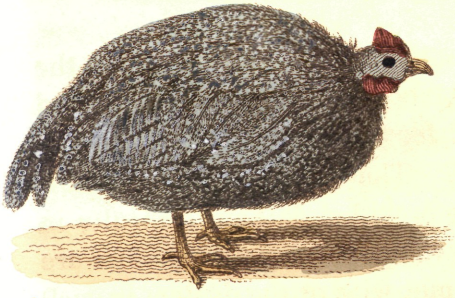


Golden Poland.

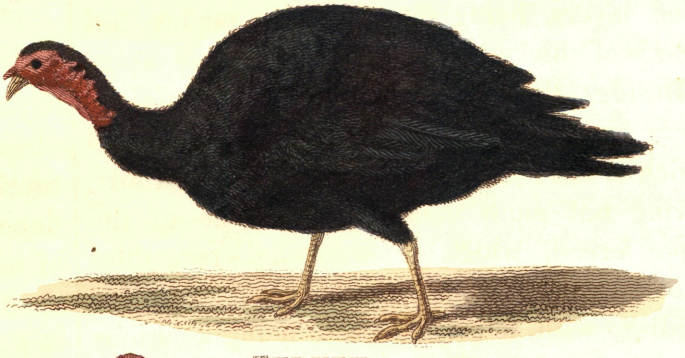




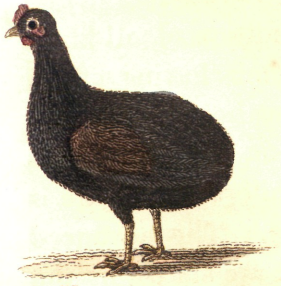
Bantam.



Galena.



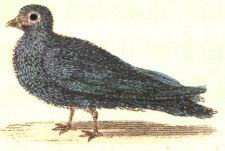
Turkey.



No-tail.



Darking.

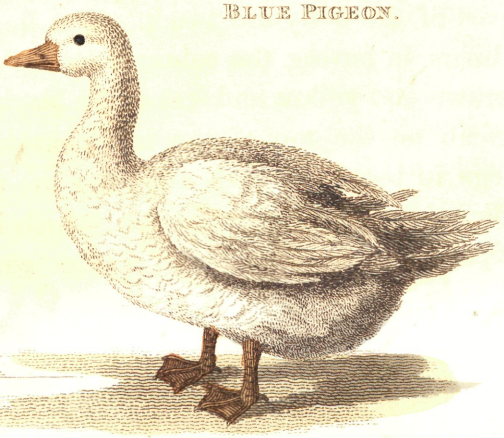


Blue Pigeon.





Common Duck.



Goose.

London, Published by Thos Kelly, *17 Paternoster Row, June 1, 1822.*

have the scales on them larger and more evident.

The best and most valuable cocks or male birds for the purpose of breeding stock have commonly much boldness, activity, and harshness in their dispositions, being often fierce and cruel to the hens, and destructive to the young progeny when not carefully prevented. The hens or female birds which are mild, gentle, and tame in their nature, and which have the properties of laying, sitting, hatching, and raising their broods well, are constantly to be chosen in this intention, as much as possible; but such birds as are larger than the usual size of their several respective kinds are never desirable in this view. Large combed crowing hens are also in general to be avoided, though they sometimes turn out well. And such as have *yellow-coloured* legs are always to be rejected, as being more tender in their nature, and having the quality of their flesh less firm and delicate in the taste.

It is the best practice in common to breed, as well as procure, eggs from young stock of this kind, as from cocks when about two years old, and such young hens as are approaching to the same age. When early raised such young hen fowls as are in the latter part of their first year's growth, will, in general, lay the soonest and the greatest quantity of eggs that can be obtained, but they are somewhat less in size than those of older hens. Such young hens are, however, commonly unfit for breeding stock, as having less care, constancy, and steadiness, in sitting and bringing forth their young. But whatever the state or kind may be which is employed for the purpose, they should have the head small, with the eye rather lively and sharp, be full in the breast part with the legs short in due proportion, and the bone not too large; the body full, broad, and somewhat long: the colour rather darkish, as being considered the most hardy and easy in being raised. It is necessary, too, in the view of having proper store hens for laying eggs in continuance as much as possible through the whole course of the year, to have them chosen from the broods of young chickens of the several different periods of being hatched, as by such means, when they become in the regular course of a suitable age for the purpose, they will naturally begin to lay, and continue it in the best succession. And in order to render the breeds of store hens more favourable for the production of eggs, much care should be had in choosing the eggs for breeding such stock from, as for both sexes they should be from such hens as are good early layers, have the eggs fine and large, and which soon begin to lay again after having hatched and raised their young broods, and not from such as are long and tedious in accomplishing these purposes. The game sort of hens are generally good for laying many eggs, and they have the property of being excellent for the purpose of food. And the Bantam breed, in the natural state, as well as when crossed with the game cock, lay abundantly, and rear many chickens, but their eggs are small, and less desirable in the sale than such as are larger; therefore, such breeds as produce large eggs in full quantities are to be preferred.

The time for beginning the breeding of this sort of poultry must depend much on the state of the season, the nature of the houses in which they are kept, the food, and other circumstances; but, where these are favourable, the more early the sitting of the hens takes place the more advantage there will be in the young produce. The best principal period, however, where no artificial means are had recourse to in the houses, is the early approach

of the spring, as the severity of the winter months is in general quite improper for the purpose.

LAYING, SITTING, HATCHING, AND REARING, THE YOUNG CHICKENS.

In raising this sort of stock, a greater number of hens may be allowed to a cock than is the case with some other kinds, but seven or eight may probably be the number which is the most beneficial in the view of eggs, chickens, and the keeping of the store-stock. It is proper to have a cock constantly with the hens, in order to render the eggs perfect, and the most certainly productive of chickens. The nests for hens are the best when formed of some soft, short, strawy material, as where it is long the eggs are apt to get entangled in it, and deranged by their feet on their leaving them; and when for sitting hens they are the most safe and proper when made on the ground-floors, where they are sufficiently dry. They should not be too large or raised too much above their surfaces, but be gently sloped to them. When raised about three or four inches above the level of the ground, they are probably the most proper. The nests should in all such cases be new and freshly made, as preventing vermin, and promoting the sitting of the hens in the best manner.

The eggs for setting the hens with should always be as fresh as possible, as the more newly laid they are, the more certain, healthy, and strong, will the produce which they afford be. They should also be as nearly of the same freshness and size as possible, being of the full medium size of the particular breeds or sorts of hens to which they belong; and be without any sort of imperfections, such as cracks, flaws, circular rings, or roughnesses, in or on the shells. Before being put under the hens, the eggs should be so marked as that they may be readily known; and if any additional ones have been afterwards laid, they should be carefully removed, as not hatching in time for the regular broods. The number or quantity of eggs which are proper must be different, as the sizes of the hens may vary, but from about seven to eleven, in the smaller breeds, and from thirteen to fifteen, in the larger, may in general be the most suitable and proper. More than the hens can perfectly cover are, however, in all cases, improper and disadvantageous in the production of chickens.

It has constantly been found, that warmth and proper forcing food are the most beneficial and effectual in promoting the early and full laying of hens; as where they are kept and fed in places where there is the constant production of a regular warmth, the eggs are not only more early in being layed, but in far greater abundance, than where they are much exposed to cold and wet in moist dirty houses and situations, as is too commonly the case.

In these views, as well as those of hatching and raising the young broods, it is, of course, necessary to preserve them as much as possible in a suitable state of warmth, with proper keep at such early seasons; as in such houses as have been already described. It is, in some measure, for want of such warmth and keep, that hens lay eggs in so sparing a manner in the winter and autumnal months, while they afford them in so plentiful a manner in the later spring and summer seasons. The white and more delicate sort of hens, in the cold seasons, do not usually lay so large a number of eggs as those of the darker and more hardy kinds. Nor, under the *moulting* process, which takes place somewhat later in the autumn, every succeeding year after the full maturity of the hens, and which is often of considerable dura-

tion, are any or but few eggs layed, so that old hens are rarely to be trusted to for eggs or the raising of chickens.

In regard to the act of sitting or incubation, there is much difference in the same, as well as in the different breeds or sorts of hens; in some, the desire of it is very prevalent, and for several times in the course of the principal season, and even through the whole year; while in others the inclination for it is so very little or slightly felt, that they will take to sitting but once or twice in the course of the season, and then perhaps but imperfectly. This difference in the nature and habits of the hens is to be taken advantage of by the careful breeder of this sort of live-stock, so that the latter kind may supply eggs in a plentiful manner for the former to sit upon and hatch. The steadiness of the sitting in the different cases must be left for the judgment of the attendants to decide upon, as hens not unfrequently display an eagerness for sitting, while, after continuing on the eggs a sufficient length of time to spoil them, they are left, and yet in some few days there is again the same display of eagerness for sitting and a return to the nests. The absurd, cruel, and useless practices, which are too frequently used, to induce hens to sit where it is not done naturally, as well as those for preventing their sitting, where eggs only are wanted, are wholly unworthy of notice, as they only serve to distress and harass the hens, without being of the least benefit in their different intentions of changing the nature or preventing the habits of them. The best and most certain inducement to sitting, is that of leaving a quantity of artificial or natural eggs in the nests of the hens; and that for the prevention of their sitting the wholly and regularly removing of them as they are layed. It may be useful and proper in all cases of frequent, steady, and close sitting, to have grain, water, and gravelly sand, set constantly at the side of the hens, as by such means the steadiness of sitting may not only be encouraged, but the constitutions and health of such as are so very strongly attached to their nests as to be in danger of being hungered, be supported and kept up; and at the same time the risk of the eggs getting too much cooled be guarded against. Where any eggs are broken in the nests while sitting upon, they should be immediately removed, and the rest made clean and dry by the use of a cloth and warm water when necessary.

In the hatching of the brood, which takes place at the end of about three weeks, as the state of warmth in the weather and the houses in which they are produced may be, attention is necessary to see that the process proceeds regularly and completely in the whole of the eggs. When the increasing growth and development of the young chicks burst the shells of the eggs, it is always proper to be careful that the work goes on in a suitable manner, and as speedily and regularly as possible, as where they are long in being released, there is rarely so much success in the hatching of the chickens; but no sort of assistance should ever be used, unless where there is plainly a necessity for it, by the chicks being evidently incapable of extricating themselves; in which cases the broods may occasionally be increased by such means, as many chicks are lost in this manner which might otherwise be saved. When the shells of the eggs have been burst, the chicks are soon set at liberty, unless when there is some hinderance, in consequence of the bodies of them adhering to the membraneous substance which lines the insides of the shells; as between which and the chicks there is sometimes a thickish gluey material left, which causes the

little downy feathers of them to stick rather strongly to the shells, and they become so confined that they must be destroyed unless released in a speedy manner. The usual method of effecting which is, by dipping the point of the finger or a portion of linen rag in warm water, and touching and moistening the adhering parts, so as to loosen and detach them perfectly; when the chicks will generally extricate themselves, after being returned to the nests, which is mostly much better than forcibly separating them, as that commonly proves fatal. It may, however, in some particular cases, be necessary, to more fully break the shells of the eggs, and gently separate the adhering parts by the fingers, after they have been moistened in the above manner, to render their separation more easy and more readily performed. In all cases, the business must be executed in the most easy and gentle manner possible, and the shells be broken into several small portions, to render the separation of the chicks more ready and complete. The necessity for the use of such means is rendered evident, by the eggs remaining unusually long in being hatched.

It has been usual to advise the taking away of the young chickens at first from the hens, as they come fully out in the hatching, lest the latter should be induced to leave the business in an incomplete manner, after a few chicks only are hatched; but this is quite contrary to the nature and habits of the hen, which always brings out the most certainly, and the best and largest broods, where left to herself; besides, the heat and warmth of the mother is the best and most essentially suitable and proper for promoting and securing the immediate growth and health of the young chicks, and far better and more natural than the removing of them, and putting them in baskets, with wool or some other soft material, and keeping them in a moderate state of heat near the fire for some time in cold seasons; as no sort of food is necessary to be given for some length of time after the hatching, the whole depending on the due heat and warmth of the parent hen. Whichever practice may, however, be had recourse to, little but heat and warmth will at first be necessary; but in the latter, after a short time, before the chicks are returned to the nests and put again under the hens, a few split grits, a little hard-boiled egg, made small, or fine crumbs of wheat bread, may be given them, with a little new milk. When the whole of the eggs have been hatched, and the brood is become quite healthy and strong, as in a day or two, in mild weather, the hens may be suffered to go out with the young chickens, and be confined separately under proper coops on some dry warm spots of ground in the state of short grass, where the chickens can have the benefit of the hens, and run about and begin to pick up their food, or under proper shelter, when the season is moist, as having their legs and feet wet in any way is greatly injurious, and often destructive of young chickens when just hatched. The different hens, where there are more than one, should be cooped at such distances from each other, as that their different broods of chickens cannot intermix, as otherwise the hens will be liable to injure or destroy such as do not belong to them. And they should also be well separated from the store and young fowls, as these, from their eagerness to get at the chicken's food, will be apt to trample them down and cause their death. But, in all cases, it will be useless to attempt the raising of early broods of chickens in cold seasons, unless in houses and places where there is considerable warmth and dryness produced in some way or other, as by fires or the

regulated heat of stoves, in the manner shewn in the subjoined *plate*.

It is only by such means as these that the young newly-hatched chicks can be preserved and made to grow in any ready, full, and perfect manner, so as to be raised with advantage to the breeders and keepers of them.

In order to provide and hatch chickens in the most plentiful manner, it is sometimes a good method, where it can be practised, to have several hens sitting and hatching at the same time, confining them very carefully to the nests to which they each belong, when they have taken their necessary daily feeds; and as soon as they have produced their broods, putting them under other more mild and careful hens, selected for the purpose, which have but small broods, so that the first hens may be re-set and produce another set of chickens. The habits of hens will, however, only in few instances allow of this being done, but, by careful selection, it may occasionally be had recourse to with advantage and an increase of profit.

In rearing and perfectly raising the chickens, several different sorts of food may be employed, but the best and most proper is, probably, after the first few days, that of some mixture of the grain mealy kinds, such as coarse oat and barley-meals, formed into a granulated state by means of warm milk or pot-liquor; coarse wheat-flour, and a little pea-meal, made up in the same way into small pellets; and steamed potatoes and barley-meal made quite soft; with any of which a little wheat, barley, or oats, in the unreduced state, may be given once or oftener in the course of the day. Such sorts of mealy mixed food should always be given in a sufficiently full quantity, at different times through the day, so that the chickens may never feel any kind of want. At the same time they should have milk or pure water as drink, given them fresh and fresh, and in such a manner that they cannot be wet in their feet or feathers, and thereby sustain injury by being cramped, numbed, or destroyed, as is often the case. Some fine gravelly sand should also be always in readiness for their use, being frequently changed and perfectly fresh. Small shallow pans or boxes, properly formed, are the most suitable and convenient for such feeding purposes. There is seldom any necessity for cooping the hens which have broods of chickens more than a few days at first, as the latter are constantly much promoted in their health and growth by being suffered to run abroad with them, in a properly limited manner, by their habits of scratching and providing the most suitable sorts of food. They should not, however, be let out of the houses too soon in the mornings while there is any sort of moisture or wetness on the grass or ground that may be hurtful to them; nor permitted to be out in changeable rainy states of the weather, as the combination of cold and moisture is greatly destructive of chickens in the early state of their being raised. The chickens usually leave the hens wholly when these return to their habit of roosting, which, when in nearly the full-grown state, they mostly imitate and follow, in taking the perch; but when this is not the case, they may be put by themselves in a proper place of safety, and after a little time be mixed with the other poultry of the same size and growth, as when put with the larger grown poultry they are liable to be much inconvenienced in many ways, and be greatly injured in their growth by being driven from their food.

FEEDING AND FATTENING CHICKENS AND GROWN FOWLS.

In the feeding and fattening management of young poultry-stock of this kind in these states,

so as to render them in the necessary fleshy-fed condition as food, in the best manner and to the most advantage, several different circumstances and matters are to be well considered and attended to, such as the nature of the conveniences for the purpose, the methods used for effecting the business, the kind of food which is most suitable, and the length of time the process can be continued with sufficient profit to the feeder.

In all cases where large stocks of this sort of poultry are raised, there should be warm dry-floored yards, with back and side shed roofs, and small divided coop-fixtures below under them, in sufficient number for holding the birds in the different states of fattening, with flaps or sliding frames before them, in order to keep them constantly rather dark, except in the times of their feeding, by which means they will not only be capable of being kept more dry, clean, and sweet, but, at the same time, be secured from the disturbing effects of too much light, by which they will rest more quietly and have more sleep, all which are favourable to the feeding or fattening process. Such yards and coops, besides having the means of better preserving the birds in these ways, have the advantage of admitting them more fully to the free air, which, in the earlier states of feeding, may have some effect in securing and increasing their health and desire of food, which must also often be very beneficial in promoting their fattening. Such feeding yards and conveniences will be not less suitable or proper for fattening the smaller chickens in, than that of the more grown fowls; but the usual means and modes of having the business performed and effected in, are those of letting the birds be wholly at liberty, or keeping them closely confined in coops on or near to the ground-floors of the feeding places: to both which methods there are objections, as, in the former, the birds must necessarily be longer and more tedious in becoming in proper fed condition, from their being too much in motion, and in the latter, from their being so very closely kept as to want the beneficial effects of the fresh air.

The sorts of food which are the most advantageous and proper for rendering such kinds of poultry the most expeditiously, in the sufficiently fleshy fat condition, are all those of the better and more forcing grain, meal, and other such kinds, which are made use of in other cases, with occasionally, towards the close of the feeding, some sort of waste greasy or other matters of the animal kind. Such forcing keep should always be fully and regularly kept up through the whole of the time of their feeding, as much loss may be sustained by neglect in these respects. Some persons consider such substances to be the best when given in the solid state, while others prefer them in the reduced mealy states; but as the frequently varying of the food is found to be so beneficial in all cases of fattening animals, the most advantageous practice may be, to give them in as many different states as possible. Thus, good oats, barley, or small wheat, may be had recourse to in their grain states, and their meals be used in their mixed states, with different other proper substances. Those of the oat and barley kinds have been found very beneficial for this purpose, when mixed up and made into a sort of paste, by means of some greasy liquid. And they may any of them be not less useful when properly mixed up with other fluid matters, which have the effect of promoting the feeding operation in such fowls, such as those of the more sweet or less fine fatty kinds, with a little common spirit, while more variety will be afforded. In these ways, by variously combining the different sorts of food, and hav-

ing frequent fresh supplies of fine sandy gravel, with pure water, or milk where it can be had fresh and fresh, as drink, the business of fattening poultry of this sort may probably be the most profitable and best accomplished. The fattening of grown fowls is more readily effected, in the close manner of feeding, where they are rather short in the leg, and of the more full growth; but such as are long in the leg, and not so much grown, are better in the open state of becoming fat, in which they run about and feed on the different waste matters which they can pick up in the yards and other places where they have the liberty of running, being little fed, except sometimes at the barn-doors, when the grain is thrashed out, or when occasionally put up for the purpose for a few days at last, which is often useless from the restraint which they feel, and the disinclination to take their food in such circumstances. These are what are termed *barn-door* fed fowls, which some persons consider as the finest flavoured and the most delicate in their flesh of any whatever, probably, in consequence of their being more fully fleshed with less fat, but which has often been attributed to other causes, as their being more in the open air, and, of course, more healthy.

In respect to the length of time that the fattening process can be continued with adequate effect and advantage in the increase of fleshy fatness in these kinds of birds in the closely confined or cooped method, it has not been yet well determined by any very correct trials, but there are reasons for believing that it cannot be nearly so long as is commonly considered as necessary for the purpose; consequently there may not unfrequently be much loss sustained by keeping them in such states for too great a length of time, as much food may thereby be thrown away. It has in some measure been found that from a little more than a fortnight to less than three weeks, according to the nature, state, and size of the fowls, are the greatest lengths of time that they can in most cases be continued so as to pay properly for the food they consume, as when they are kept longer in such states they decline gradually in the quantity of their flesh and become almost all fat, and much less valuable as food. In places where coop-fed fowls are brought to the proper condition in the most ready and effectual manner, the time employed for the purpose very seldom extends to more than a fortnight, but is often completed within that period of time. For this purpose, the Darking sort of fowls are the best formed, but the game and small sorts the soonest in perfection for such use.

These will probably be found the best and most beneficial methods of rendering chickens and young grown fowls in proper condition as food, but there are other practices had recourse to for the latter sort, in which they are supposed to be more fully and more speedily completed in their fatness.

CRAMMING.

There are many districts in the more southern parts of the kingdom which are in some degree famed for the success and advantage which they are supposed to have in this manner of fattening grown fowls; but the practice seems to differ very little in any of them. In those which are the most celebrated, and believed to fatten their fowls to the largest size and most perfection, the methods pursued for the purpose are principally these. The fowls, after having been put up in the coops for some days, or confined at once in some dark proper situation, are regularly crammed, in the manner of the turkey, in the morning and at night, being kept during the whole time as warm as possible.

The pasty substances which are made use of as food in the practice are those of the meal of oats mixed up with hog's grease, milk, pot liquor, and sometimes sugar; the same sort of meal, with suet, sheep's plucks cut fine, and treacle; and barley-meal, mutton suet, milk, and the same sweet matters. In preparing the foremost of these mixed sorts of cramming food, a little of the meal is first made with the pot liquor into a sort of gruel by boiling, with which the rest of the materials are then kneaded together and formed into proper sized rolls for being broken into suitable pieces for cramming the birds with. The other sorts may also be mixed up in a fine manner by the different liquid matters which they contain, and be made up in a similar way for such use. The forcing of these sorts of food upon the birds is not to be continued longer than a fortnight, as they become completely fattened in that length of time, and if continued longer, they are liable to become so disordered from the over-load of such food, that they are either destroyed or their flesh rendered red and spoiled. The cramming practice is not, however, in all cases had recourse to with success in attempting the high fattening of fowls, as they occasionally become disgusted with such food, languish and waste in flesh, without getting into the full fleshy fat condition which is wanted in such cases. How far the flesh may be rendered less fine and delicate in the flavour by such high fattening has not been well decided; but though it may be useful in the more ready and better sale of the fowls, there can be little doubt but that some loss is sustained in the fineness of the food.

CUTTING AND FATTENING CAPONS.

These are practices which are principally confined to and kept as a sort of secret by the breeders of poultry in a few places in the counties of Sussex and Berkshire, where the business is carried on with success and advantage, though many birds are lost in the preparatory operation in consequence of the great nicety, exactness, and attention, which are required in performing it. By it the male bird is emasculated and rendered more fit and proper for being made large, fleshy, fat, and fine as food by means of proper feeding. The manner of executing the business is somewhat in this way; after the wings and feet of the birds have been properly secured, and the feathers removed, an incision is made with a very sharp knife for the purpose about one inch in length, and the same distance from the spine, near the rump, in a slanting downward and forward direction, through which opening the male parts of the birds are drawn and removed with the utmost care and gentleness, the wound being afterwards closed and kept free from the action of the external air by some adhesive substance being spread on cloth and applied over the part. When possible, an experienced cutter should always be had, as much dexterity and knowledge are necessary to the success in such cases, and the prevention of the great loss that may otherwise be sustained, but especially where the practice is not in much use. The large short-bodied fowls are the best for this purpose, and when they are about three quarters of a year old.

In some places, where fine large fat capons are much produced, the food which is used in fattening them is the same as that which is employed in the cramming practice, as described above, but there are other sorts supposed to be had recourse to in readily raising them to such full states of fatness, such as wheat in the unreduced state, with common spirit and water as drink, in the proportion of about four parts of the former to one of the latter, which from the

grain being dry and husky, causes them to take more drink, which from its nature has the effect of disposing them to be more quiet and to sleep more, by which and the darkened state in which they are kept the fattening process may be promoted and more perfectly effected. The more, however, all such food is varied, the greater will be the effect in all such cases.

As the chicken and grown fowl, in any way of fattening them, seldom cost more at most in the former than from a half-penny to a penny in the day, and in the latter from a penny to three half-pence, or perhaps a little more, in some cases, in the same length of time, there must often be a good profit derived from the practice when well performed, as well-fed chickens rarely sell at less than from one shilling to one shilling and two pence each, and grown fowls, in the same state, at less than from five to six, seven, or more, the couple, on the average. And sometimes, in the case of capons, eight or ten shillings each is brought where they are very large and fine.

KEEPING STORE AND OTHER POULTRY STOCK.

The modes of keeping store and other stock of this sort in the most beneficial and effectual manner for the affording of their several products have much interest and advantage in different points of view, and may prevent much loss, waste, and improper application of many useful sorts of food in the keep of such birds. Where the production of young fine broods of chickens, or the laying of many good eggs at early periods in the season in severe weather, are the objects, there should be little sparing in the use of the most forcing sorts of keep, such as grain of the best small wheat or barley kind, seed of the hemp or other hot exciting similar sorts, with occasionally different substances of the waste cheap animal and fish kinds in small portions at a time, as hens are very fond of them, and they have much effect in these intentions. All matters which have in any degree a scouring quality should be carefully avoided. In this manner of keeping such poultry, when regular and begun sufficiently early in the season, and having good healthy cocks in much greater proportion to the hens than is usual in other cases, much more success may be expected than in the common methods which are made use of for the purpose. The chicks will also be finer and the contents of the eggs more full and substantial, going much farther in the uses to which they are put. There is mostly a great redness about the head and gills, and a sort of *cackling* noise made by the hens for some days before they begin to lay. And when thus kept, and they are of the proper sorts, they often lay a very considerable number of eggs at these and different other seasons or times in the course of the year, so as to render much use and profit to the keeper in that way, although the expense of their keep may stand rather high for such stock.

But in the more usual manner of keeping store fowls on barley or some other sort of grain alone, the consumption of food would seem, from the few attempts which have been made to ascertain it with correctness, for a proper stock of half a dozen hens and one male bird, to be in the proportion of about half a peck of such grain in the week, worth not more than ten pence at most, or somewhat more than two pounds in the year for the whole; and the number or quantity of eggs which would be produced by the same stock in different seasons or periods, under good management, and preventing their sitting as much as possible, in the same length of time, will be found to be in the three winter months about one hundred and three; in the three spring ones, two hundred

and forty; in those of the three summer ones, two hundred and eighty-eight; and in the three autumnal ones, one hundred and thirty-three; or in the whole of the year, about seven hundred and sixty, being nearly in the proportion of one hundred and twenty-seven each hen, which would be worth from four to five pounds, if sold at the price of new-laid eggs, and leave a profit of more than two pounds ten shillings, and in the more usual modes of sale more than two pounds, besides any chickens that may be raised. There appears also, from such trials, to be a difference in the advantage and profit of keeping this kind of stock, from the difference of the manner in which the food is had, as where the birds are suffered to eat their food at their own pleasure, the consumption is less, and the produce in eggs rather more, than where they are confined to having it at certain times, as twice or oftener in the day, which is accounted for from the circumstance of their feeding less greedily in consequence of their being less hungry when they take in their food, and of course a smaller portion at a time satisfying them. And as, in the above manner of keeping store fowls, the cost is somewhat less than three half pence each in the week, and the difference from the different manner of their having their keep nearly a half-penny in the same time, the advantage of it is conceived to be about fourteen shillings in the year for the whole, which is an advantage not to be disregarded in keeping poultry stock of this kind.

As the larger sorts of fowls probably consume but little more food than those of the small kind, it may commonly be the most profitable to keep the larger breeds, from the food which is necessary being so much less in proportion to the size and value of such birds and their eggs, they being often nearly double in the price which the small sort will fetch; though the latter, from the fineness of the flesh which they afford, and the goodness of the quality of the smaller eggs which they produce, which, in nearly the same number, are said to serve every culinary use equally well, may sometimes be convenient and suitable.

It is commonly the most profitable practice, to change and sell off store poultry of the hen kinds, while they are in the proper states of flesh for that purpose, which should not be later than the early part of the third year of their age at the farthest; but they may often be disposed of to more advantage sooner, as in the cases where young hen fowls, not intended as continued breeding-stock, have been early raised and well kept, so as to lay plentifully in the succeeding autumnal months, as the benefit of their eggs may be secured, and then the fowls themselves be sold off in tolerable condition in the beginning of the second year, when their courses of laying are over.

In the time of undergoing the constant annual moulting febrile state in grown fowls, which usually takes place in the autumn, and continues in the losing of the old feathers, and the restoring of the new ones, for some length of time, the birds are wholly improper for any sort of use; and it is the same with young fowls, while changing their plumage in the spring of the year, both which circumstances should be attended to by the poultry keeper.

In keeping poultry, it is likewise necessary, that when there is a continued dislike in the cocks to particular hens, as often happens, that they should be removed as soon as possible, and others substituted in their places that are more liked and better attended to by the male birds; and where cocks are necessary to be changed, it should always be seen that the hens

associate well with them, as it is sometimes not the case, from which much injury and loss may arise.

Section VII.—*Diseases of Fowls and other Poultry.*

There are undoubtedly many deranged states of the general system of fowls and birds of the poultry kind, and affections of their different particular organs and parts, which may, as well as those in other sorts of animals, be properly denominated diseases; but which in them, from their nature and circumstances, are often capable of being removed by suitable changes in their food or in the manner of their being exposed to the weather, with little or no remedial assistance of any other kind; yet, in some cases, it may reasonably be supposed, that benefit may be derived from suitable remedies, carefully used and applied in a proper manner for the purpose.

Little, however, has yet been stated, with any sort of correctness, in respect to the complaints which affect these kinds of birds, but the following may probably comprehend the most of them, and the means of their removal.

CATARRH, COLD, OR ROUP.

This is a complaint to which poultry of most sorts are liable and disposed, but more especially those of the hen kinds. It most commonly arises from sudden changes in the weather, such as from very cold to mild and warm, or from moist, cold, rainy, and wet, to dry and hot; but in some cases, from the improper damp places in which the fowls rest; much continued dampness or wetness; the change of situation, and other causes of the same nature. It sometimes comes on in a very sudden, but, at others, in rather a gradual manner, and has mostly much action in its onset attack, which afterwards declines into a state of weakness, somewhat in the manner of the common cold in the human subject. It affects fowls in all the stages of their existence, but more generally those which are of the younger kind.

The particular appearances by which the disease is known are, at first, those of there being more or less fever, and the parts about the top of the windpipe and throat becoming somewhat swelled and inflamed; after which there is a sort of sneezing, with much running and discharge taking place from the nostrils; the eyes become affected, sometimes in a very high degree, so as to occasion total blindness: the lids are swollen, and have a livid aspect; there is a loss of the desire for food, but an increased inclination for drink; the feathers become ruffled, and there is a loss of their glossy appearance; the breathing is difficult and sounding; and the birds sit in a solitary manner in dark corners, in a sort of trembling, gaping, dejected, state. When the breath and the discharge from the nostrils become fœtid, the disease may probably be considered as having reached the highest stage.

In the removal of the catarrh or roup in fowls, when in the more mild form, little more will be necessary, than to keep the birds perfectly clean, and in a proper state of warmth, letting them have warm steeped barley, or some other sort of grain, in a frequent manner at the same time. But where the complaint displays a more high and inveterate cast, greater care and attention will be required, in order to preserve the birds. The parts about the nostrils and under the throat must be often washed and kept clean and sweet, by means of a solution of soft soap in warm water, and the eyelids, when inflamed and swelled, be occasionally well washed and moistened, by a very weak mixture of the diluted solution of subacetate of lead and

rain water or milk a little warm. And as soon as the inflammation and swelling have disappeared, the edges of these parts be once or twice wetted with a little spirit and water. When, however, there is much fever present, it may often be first necessary to give from about half a grain to a grain of submuriate of mercury, once or twice, in a cram of some sort of dough. And, in some cases, where the fowls are worth the trouble, a cram formed in this manner, and given in the same way, may be more useful. Half a grain or a grain of antimonial powder, mixed with a small portion of bread crumb and a little sugar into a small cram, or made in the granulated form, if the birds can pick.

These seem the most proper means of removing this principal complaint in poultry; but when it proceeds so as to take on much fœtor in the discharge which attends it, the disordered fowls should always be instantly removed from the others, and be destroyed, or put into separate places to be kept until they become well, as it promotes cleanliness and may prevent the further spreading of the disease.

GARGLE IN GEESE.

This is probably an affection in these kinds of birds of somewhat the same nature as the above in fowls, as it is usually occasioned by cold and sudden changes in the state of the weather.

It makes its appearance by a sort of tightness, obstruction, or want of free use in the parts about the root of the tongue and the upper ends of the throat and windpipe, causing a kind of stuffing up in the head, and loss of freedom in the breathing of the birds.

Changing the situations of the birds, and rendering them less exposed to cold, with the full free use of warm soaked substances of the grain kind, will probably be the best means of cure, though garlic, combined with butter and other such matters, have been advised.

LOW FEBRILE AFFECTION, OR CHIP.

This low febrile affection is common to, and liable to attack, chickens, when about three weeks old, but principally when the weather is cold, changeable, and bad from moisture, as such causes aggravate it greatly in all cases.

Its approach is known by the constant chipping noise made by the chicks so affected, by the loss of the glossy fineness of their plumage; the drooping and hanging down of their wings; and their sitting pining and wearing out in nooks and corners, with a continual *chipping*, until they die or the disease is removed.

This is a state in these birds which is rarely remedied; but the most proper means for the purpose are, perhaps, those of giving them warm softened food frequently, where they can take it, with warm water or milk, in which a little nitrate of potass has been dissolved, as drink, and at the same time carefully removing them into sheltered places, where the sun or the warmth of a fire may be had, as they are always powerful in their effects in such cases.

CRAMPY SPASM.

This is a state which frequently takes place in ducklings a short time after they have been hatched, and begin to run about and take the water. In it there is little or no sign of disease, as the young birds continue to run about until the very moment in which they all at once drop dead. The cause may probably be, that of their being too soon permitted to run out in the dews, or take the water with the parent birds, by the too severe cold, of which they become cramped and destroyed.

If there be time for the purpose, the best

means of saving them may probably be, those of removing them gradually into higher degrees of warmth, and confining them so as to be brooded upon by the mother ducks.

SCOUR, OR FLUX

This is a state which sometimes occurs in fowls as well as other sorts of poultry, and which requires to be attended to, as hindering the proper thriving and feeding of the birds. It mostly arises from cold and improper fermenting sorts of food.

It is shown to be present by the birds becoming suddenly thin and lean, and the want of their usual appetite in feeding.

It is best removed by the proper change of food, as from the soft to the more dry and solid, or in other ways, with the varied use of rice and good wheat, the houses or places in which they are kept being constantly preserved in a perfectly dry, clean, and well-aired, sweet state.

RESTRICTED BOWELS, OR CONSTIPATION.

This is a contrary state to the above, but which occasionally takes place in birds of the poultry kind. It is caused by improper sorts of the dry binding kinds of food being given in too large quantities, and many other such causes.

It is rendered evident by the great uneasiness of the birds, and their rejecting their food in an unusual manner.

It is the most readily removed by the use of soft, hot, laxative matters, such as scalded bran and the skimmings of greasy pot-liquor, with the picking of green food in a more full proportion, in the less severe cases; but in others it may sometimes be necessary to give a grain or two of submuriate of mercury in a cram of some laxative moist substance.

SCALE, FILMY SKIN, OR PIP.

In this disease, which is rather common in poultry of the fowl kind, there is a sort of white scale or skinny film formed on the tip of the tongue, which is supposed to arise in consequence of the birds picking up, or not having their food perfectly clean and sweet, but in a foul state. It may probably, however, be produced by other causes.

In its cure, the scale is to be carefully removed by the nail, or some other means, and the bared part washed with some mild escarotic fluid, such as a weak solution of common salt in water, by which the natural surface skin is restored.

In young turkeys, when thus affected, after the skinny film has been clipped away, or otherwise removed, the cure is said to be effected, by giving a few small crams of rue and the plantain herb, finely bruised and mixed up with fresh butter.

AFFECTIONS OF THE EYES.

The circle of the lids of the eyes in fowls are, in some instances, affected with inflammation, and a slight degree of swelling, which differs much from that which takes place in the *roup*, as it is a state that mostly arises, or comes on, from exposure to currents of cold air, or sudden, hot, sunny gleams, after such exposure, and is perfectly of a local nature.

The removal of these affections is to be accomplished, when slight, merely by putting the birds into more warm and sheltered shady situations; and, in other cases, by the use of such applications as have been advised for the affection which happens in the eyes in catarrhal cases.

BLINDNESS.

This is a state which often arises from fighting among the male birds, but which seldom pro-

ceeds from any other cause. It may, in most cases, be readily removed, by first keeping the parts well bathed and soft, by means of warm milk and water, and then using a weak discutient saturnine wash for two or three times.

OBSTRUCTION IN THE CROP.

In birds of the fowl kinds, stoppages are sometimes produced by their picking up lime, mortar, and other cementing substances, as well as matters of the small bean and large pea kinds, which swell much and suddenly in the softening bag or crop before they pass into the gizzard or grinding stomach, and the bowels; and which, if not speedily removed, must soon destroy the birds. In these cases, the fowls sit about alone in dark places, and neither eat, drink, or discharge, almost any thing, but look unusually large and full, though dull and dejected.

The remedy in these cases is that of making a small suitable incision into the crop externally, by means of a very sharp pen-knife, and taking out the obstructing matters, and then stitching up the wound carefully, when it will soon heal, and little inconvenience be suffered by the bird. We have seen one or two cases of this kind succeed perfectly, and seemingly without any danger in the operation.

GLANDULAR SWELLING ON THE RUMP, OR ABSCESS.

The small glands of the rump, in birds of the poultry kinds, sometimes take on a slight inflammation and swelling, so as occasionally to suppurate and form matter. In such cases, when troublesome to the birds, an opening may be made into the parts, and the contents forced out, afterwards washing the cavity well with a solution of common salt in water.

FILTHINESS FROM VERMIN.

This is a state in fowls which occasionally happens where they are badly kept, and the necessary cleanliness not attended to. The remedy is, better keep, the removal of all nastiness, and a more free and open state of the air, with the frequent use of fine dusty matters for the birds dusting themselves with.

WOUNDS, BITES, AND SCRATCHES, ON THE HEAD.

The rawness and soreness often produced on the heads, especially of the male birds of the hen poultry kind, by biting and scratching, in fighting, or in other ways, sometimes become troublesome, and require something to be done to them to prevent the mischief that may otherwise take place by the inflammation that may follow.

The best application in these cases is, probably, that of a little of the compound tincture of benzoin, and a few drops of the tincture of opium, used so as just to moisten the parts, as it will not only promote the healing, but, by the taste, prevent the other birds from picking at the parts, as is commonly the case, and the cure be thereby protracted and rendered more difficult.

SPURS OF COCKS.

As these hard horny bodies, in the older male birds of the gallinaceous poultry kind, are sometimes troublesome and inconvenient, by hindering their walking, and wounding their legs from their being of too great a length, as well as attended with danger in other ways, it may be useful and necessary to have them occasionally cut and shortened in a proper manner.

SECTION VIII.—*Nature of and Uses to which different Products of Poultry are applied, and the Manner in which they are provided and preserved.*

THE substances which are afforded by birds of this kind differ materially in their nature, pro-

perties, and purposes for which they are employed, but they have all valuable uses or applications in some way or other, either as food or the benefits they supply by other means.

EGGS.

These are highly useful and important, both as supplying an extremely nutritive substance as food, perhaps, in consequence of its containing oxygen and carbon so largely in its composition, and as contributing so greatly to the forming of many other matters of the more nourishing kinds. The contents of the egg being found to weigh from about one to two ounces and a half or rather more, as the sizes of them may be, which, as the hen will lay upwards of one hundred eggs in the course of the year, is a considerable produce of such fine nutritious animalized matter in the course of that time for so small a bird, and the little cost of the food which it requires.

KEEPING EGGS.

The egg being often necessary to be kept for some length of time before it is used; the means of effecting this in the most effectual and convenient manner, so as to prevent their loss of weight and mustiness, are greatly useful and important. It has been attempted in many different ways, but chiefly by the use of substances which have the power of closing up the pores of the shell, and those which, from their nature and the fineness of their particles, prevent the action of the external air upon them. They are both contended to be convenient and completely effectual for the purpose.

In the former, which has the advantage of cheapness in the materials which are employed for the purpose, the method is this:—put unslaked stone lime, in the quantity of about half a peck, into a proper vessel, and pour upon it four gallons of clear water; keep the whole well stirred up for several times, then place the eggs carefully in it. In this way they keep well and good, but are not to be taken out until the time of using them, as they are in danger of soon spoiling. This is the usual method employed by pastry-cooks and other such trades.

In the latter, the business is effected by first putting a suitable thick layer of common salt at the bottom of a proper tub or vessel, then placing a layer of eggs with their small ends downwards into it, in a close manner over the surface of the whole; when they are to be covered with a second layer of salt, and another layer of eggs set closely over the whole, as before, continuing the proceeding in the same manner until the whole of the eggs which are necessary are so packed, or the vessel becomes full. In this way they are conceived to be equally well preserved from the effects of great degrees of both cold and heat. It has been the common practice in some of the north-west parts of England, for a great length of time past, to put them either into salt or oatmeal, in the view of successfully preserving them. Where the former of these matters are employed, the same material is capable of being used many years for the same purpose, especially where sufficient care is taken that it does not become damp or wet. But perfectly sound eggs should only be so packed and preserved; and it is material also that they be collected and packed as fresh as possible from the nests of the hens. The latter is not so proper a material on several accounts, but it is better for immediately putting them into when they are to be soon used, than mutton suet and some other such expensive substances, which are often employed for the purpose.

FEATHERS AND DOWN.

These are products which are afforded by

most sorts of birds of the poultry kind, but which are much more abundant and valuable in some than others, and which are taken from them in the living as well as the dead state. They are extremely convenient and applicable when properly prepared for different useful purposes, such as forming beds, pillows, tippets, shawls, and various other such articles. The feathers of the goose, and perhaps of some other large birds, are the best for the superior articles of the first of the above kinds, and those of the hen and the smaller sorts of poultry for the latter or inferior. The fine downs of the swan and the eyder duck are principally employed for the finer purposes of the second kinds, and that of the goose and some other such birds for those which are inferior. In the taking of the feathers as well as the down from the living birds, much care should be had to have it performed when they are in the proper state or condition, as when they are quite perfect in their lower ends, and not while they are soft and bloody: the business should also be executed in the most careful and gentle manner in all cases.

PULLING LIVING BIRDS OF THE GOOSE AND OTHER KINDS.

Although custom and interest have in some measure sanctioned this practice, it has been much objected to on account of the pain, uneasiness, and injury it does to the birds, which, though not always so great as some persons suppose, in some cases may be considerable. But when well fed at the time, it has been stated from actual trials that they not only thrive and go on better afterwards, but that the feathers grow faster and are superior in their quality than when the operation is wholly avoided. Consequently, if the proper times and modes of plucking the birds be sufficiently regarded, little inconvenience or harm may arise to them and the practice be beneficial, as there will be little or no pain given, and the feathers will be properly pulled from the several parts, as from under the wings and the breast parts, and they be left well protected and in a proper state.

It has been a custom in some principal geese districts to pluck the geese at the distance of every six weeks from about the latter end of March until the end of September. In these cases the fine feathers from their breasts and backs are only to be taken. In the old geese and ganders, they, however, bear the full pulling of their feathers well for three times in the year, at the distance of seven weeks each; and in the young broods, the commencement of the pulling of their small feathers may generally take place at about a quarter old with the most benefit. The winging of geese is sometimes performed only twice in the year, taking five quills out of each wing; but in other cases every quarter, taking ten feathers from each goose, which are disposed of at about five shillings a thousand. In small common geese the value of the feathers is calculated at about three pence a head each time of plucking, or one shilling for the whole year, and the quills at about three pence a time. But when such geese are plucked dead, they are estimated to afford about six pence in feathers, three giving one pound. Large well-fed geese will, however, commonly produce, when plucked dead, nearly a pound, worth more than two shillings. From the feathers which are taken from live geese selling at so much higher prices than those from dead ones, the advantage of the practice is rendered sufficiently evident, and to afford a profit which is not to be disregarded by the poultry-keeper.

The down is most probably the best and most

properly taken from the birds in their dead state; but when in the living, in the swan and duck kinds, it is only to be collected when ripe, from about the wings. There is the greatest quantity, and that which is of the best quality, produced from birds in the lean condition. In order to have down as well as feathers in the best perfection, in regard to their elasticity, with the least tendency to decay, which are properties of material use in their different applications, they should be plucked as speedily as possible after the birds are killed, and be as soon stoved and rendered fully dry as can be done, as they are thereby prevented from taking on heat, sticking together, and becoming injured in that way.

DUNG.

The dung, littery matters, and sweepings of poultry houses, in many cases, form much manure, which is valuable in different modes of application, as for top-dressing, or sowing over crops in the growing state, and for being turned into the soil. The fine, reduced, dungy materials, produce very beneficial effects in the former of these methods, and the more coarse littery substances in the latter.

Some persons have absurdly objected to the dung of the goose on pasture lands, as rendering them less healthy for the pasturing animals of the cattle and other kinds; but as the manure afforded by the goose is the same in the nature of its constituent principles, according to the sort of food which it consumes, and as readily undergoes the same changes as that of other kinds, there can be no reason whatever for supposing that it can be the least detrimental in that way. And as by means of proper management this sort of poultry-stock may be made to produce no small quantity, it may often be considerably beneficial in this point of view, as contributing to the compost heap of the farmer.

Wherever poultry of any kind is required to be of the best flavour and quality, it should never be suffered, after being killed and having the feathers removed, to be packed up in a close manner with the entrail parts in the body, as by the heat which is taken on, in such a state, the taste of the flesh is often much injured. This is frequently the case in sending fowls and birds so packed to the markets of large towns, however convenient it may be.

Chapter XII.—LIVE STOCK.

PIGEONS.

Section I.—*Nature, Character, Descent, Uses, different beneficial Kinds, and the Inconveniences, Advantages, and most proper Houses, in keeping such Birds.*

There can be little doubt that the pigeon was one of the most early inhabitants of almost every country or part of the globe, as it is found to prosper well in the temperate, the less temperate, and the burning regions under the tropics, no intensity of heat, or moderate states of cold, being unsuitable to the nature of its constitution and habits. It also displays, in a striking manner, the vast benefits of even partial domestication over the natural wild state, by

the astonishing increase, and almost numberless varieties which it produces, under the cherishing care and influence of its keeper, and by the beauty of its form and covering, and the innocence of its habits, has become nearly everywhere a domestic favourite of mankind. As it is the nature of the pigeon, likewise, to be much delighted and attached to its home, by the power of strong scented substances, such as asafœtida, and many others, as well as by those in which common salt abounds, the properly providing and applying of them may often be of great use in domesticating the birds more perfectly, as they are not unfrequently disposed to leave their old situations from the slightest disturbance, and sometimes without any apparent cause whatever. In their manners, the birds are lively, gentle, and pleasing; they are fond of noise and society, and the different sexes are more perfectly attached to each other than in most other cases.

These birds are characterized by naturalists, as having the bill weak, straight, and slender, with a soft protuberance at the base, in which the nostrils are placed; the legs short and red, and the toes divided to the origin, or the part where they rise.

APPELLATIVES, OR USUAL NAMES.

The old grown birds are called *cock* and *hen* pigeons, and the young produce *squabs* and *squeakers*, as they are less or more advanced in their age and growth.

ORIGIN.

The tame and numerous varieties of the domestic pigeon are, most probably, in a great measure, derived from the wild or stock-dove, which, in the natural state, is of a deep bluish, ashy colour, having the breast shaded with a fine varying green and purple, and the wings marked with two bars of black; the back white, and the tail barred near the end with black; by which simple tints, in the different modes of propagation, has the almost endless changes of this sort of bird been produced.

In ancient as well as modern times, these highly-varied beautiful birds have been kept both for the pleasure which they afforded and for the benefit which they produce in the way of food. In the latter of which intentions, the flesh of them, while young, and the birds in good keep, is mildly stimulant and very nourishing; but when more fully grown, more solid and powerful in its effects, though somewhat less digestible. Where the flesh has more of the dark cast in its colour, as from the less fine dark sorts of birds, the flavour is higher and more inclining to that of the wild pigeon, while, from the more light coloured sorts, it is more delicate, and less high in the taste.

The age of the pigeon extends to something more than twenty years, and it is considered to be in the mature state when the quill feathers in the wings are complete.

BREEDS OR KINDS.

There are many breeds and varieties of pigeons which are made use of in different other intentions, as well as for the purpose of food; but the most proper, valuable, and profitable sort in the latter point of view is probably the dark blue grey field or dove-cote kind, as being of the most hardy nature and the best size. The other mixed breeds and sorts of the domestic pigeon, which are more tender in their nature and less inclined to labour in the procuring of their food, are not so useful or proper for the dove-cote system of stocking in the design of raising food, yet as they produce a great number of young by the greater frequency of their breeding, there may in some cases be a benefit and convenience attached to them, though the advantage may be less in

consequence of their requiring for the most part more keep. The different *runt* sorts, from their being large in size and breeding early and quickly, may also sometimes be found not improper as tame pigeon stock in such cases.

In the *fancy* practice, which is now somewhat on the decline, though in the metropolis and other large towns it notwithstanding sometimes produces considerable profit and advantage, there are many curious breeds and varieties which have extraordinary forms and colours that excite attention. They are, however, never proper as the pigeon-house stock of those who raise and provide them as human food.

PIGEON-HOUSE PRACTICE.

The keeping up and extending the pigeon-house system has been much objected to as improper and injurious to individuals and the nation at large, in consequence of the immense destruction of corn which it is believed to occasion; and imaginary calculations have been formed of the consumption of grain which is annually caused in this way, as amounting to the *vast* quantity of nearly five millions of Winchester bushels, of the value of more than one million of pounds! yet notwithstanding as the pigeon is by no means wholly a granivorous bird, but one which feeds equally or more fully on seeds of different kinds and other matters, it may be less objectionable in this view than such calculators have supposed. However, as all birds which are at liberty will necessarily partake more or less of the produce of those who have no interest in them when not duly supplied with food, the pigeon, if regularly well fed with the proper and more cheap sorts of food at home, will probably be but little injurious to the farmer, while the owner may derive more profit from it on account of its being attached and kept more to its residence, and producing more young, and an increase of such food be thus raised. It may therefore probably be owing as much to the want of proper management in the keeping of pigeons as to the mischief and destruction which they may sometimes cause, that the decline in the practice of keeping them in this intention is to be attributed, and that by pursuing a better system they may become a more beneficial sort of stock and be more advantageous to the public in the quantity of food which they may supply.

HOUSES FOR PIGEONS.

It is material in the keeping of these birds that proper houses or places and conveniences be provided for them, so as to be perfectly secure from vermin of all kinds. The front parts where the pigeons enter should always have a somewhat southern aspect, as they are much delighted and benefited by warmth and as full an exposure as possible to the influence of the sun for the most part of the day. The entrance holes should have room enough for the easy passage of the birds without being too large and improper in other respects, the alighting platforms before them extending outwardly rather more than usual, in order to afford greater convenience to the birds in perching upon them, and be constantly kept white by painting, as being the most agreeable and inviting to them, and affording the ready means of their finding their homes. The external forms of such houses may be various, as situations and circumstances may render necessary; but the nature and habits of the birds require that they should never have too much height from the main floors where the pigeons rest, but these sink less or be nearer on a level with the places where they enter than is commonly the case. The materials of which such houses or buildings are formed and covered should in every instance be such as promote warmth and

security, without being too expensive. Pigeon houses may be rendered ornamental as well as useful in different situations, according to the taste of the proprietors. In the manner of arranging and fitting up the internal parts of them, the economy of the pigeon in the breeding state demands still more attention, as from its delighting so much in ease and freedom and so speedily bringing forth its young, more room in the nesting parts is required, as it must be such as admits of two nests being formed in each for every pair of birds, or instead of being single, as is usual, these parts should be double, in order to produce the best effects in raising pigeons. These *lockers* or divided nest spaces, which are put round the insides of the houses in rows one over the other, as may be necessary, are made of different sorts of matters, as those of which the outside walls of the buildings are formed, and those of lighter and less solid kinds, which are often more proper, as being warmer and more airy for the sitting and rearing birds. Wicker-work baskets have been much recommended by some persons for the purpose, as approaching somewhat to the nature of the nest of the pigeon in the natural state, but the expense of them is too high. Lath and clay are also suitable materials for such use and more cheaply procured. But lath or clay alone are probably the best substances for the purpose, as being the most airy and preventing the harbouring of nasty vermin and keeping the nests more sweet and clean. There should likewise be narrow projections in the fronts of the lockers for the pigeons to light on.

In houses where shelves alone are in use, they should have in the first rows a proper height from the floors and be nearly two feet in breadth, being placed at the distance of about a foot and a half one above another as high as necessary, divisions being formed at the space of every three feet, which will afford the means of having two nests in that space, and by a proper ledge being fixed in the front, the sitting pigeons be sufficiently concealed and rendered free from disturbance; or a farther division may be made in each such space, which may sometimes be convenient in preventing the young from interrupting the newly sitting hens, as female pigeons often soon leave their young to the males and again begin to lay and sit.

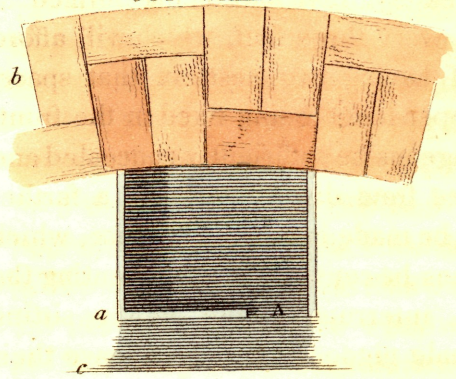
In some cases, for the sake of greater ease and convenience in having the nests cleaned out and made sweet, the front parts of the nest divisions are left wholly open; but as the young produce, in the more early states of their growth, are liable to fall out and be destroyed, it is better to have them partly made up at the fronts by either a low fixed or moveable piece of board.

The nature of the pigeon seems evidently to require that the houses for them should be every way spacious without having too much height; the roofs being rather flat for the better resting of the pigeons upon them, and well screened from the north-east, so that they may change their places on them as the sun alters its general influence on them. The inner parts should be rendered as convenient as possible in the manner that has been seen, and by having a sort of large stand and other conveniences in the middle for the birds flying down and sitting upon, and to aid the young in their first taking wing and quitting the nests, as they are much benefited by such means.

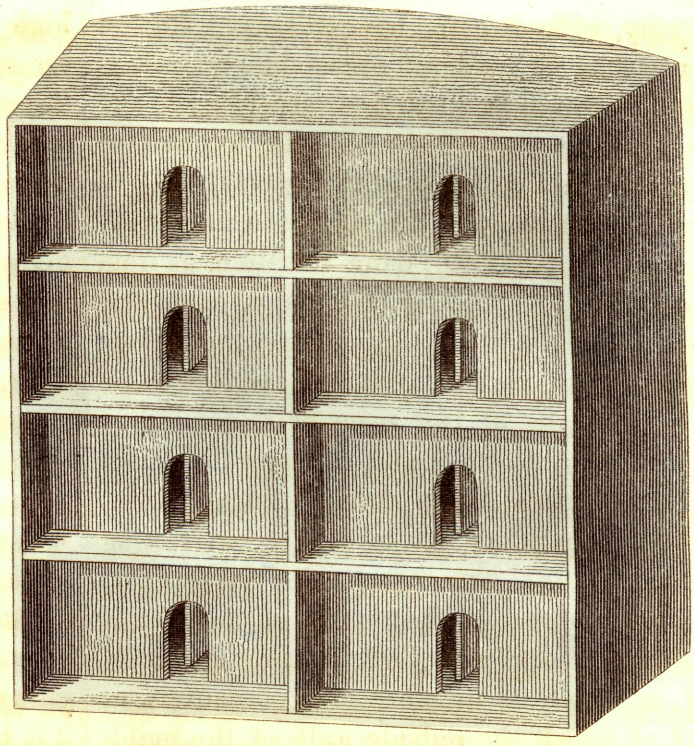
These are usually the most material points and circumstances which require to be attended to in the forming and fitting up pigeon houses, for the purpose of breeding and raising pigeons with the most success.

IMPROVED PIGEON HOUSES & NEST APPARATUS.

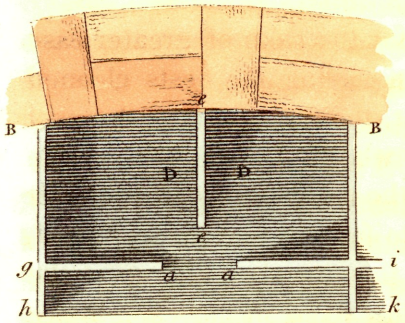
SINGLE LOCKER.
OUT WALL.



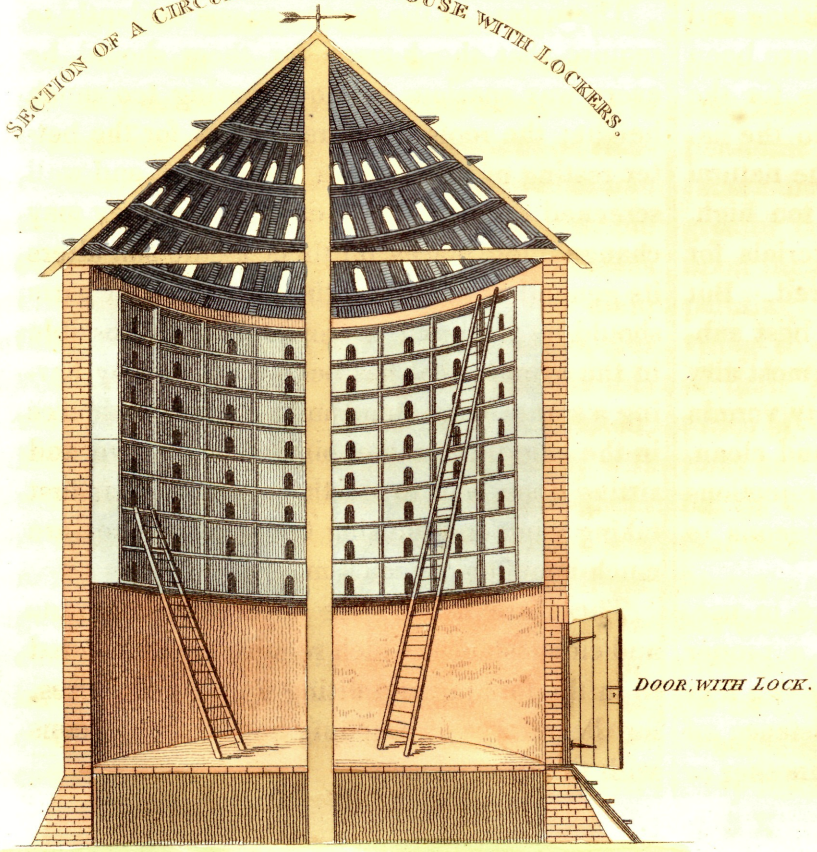
PERFECT LOCKER.



DOUBLE LOCKER.

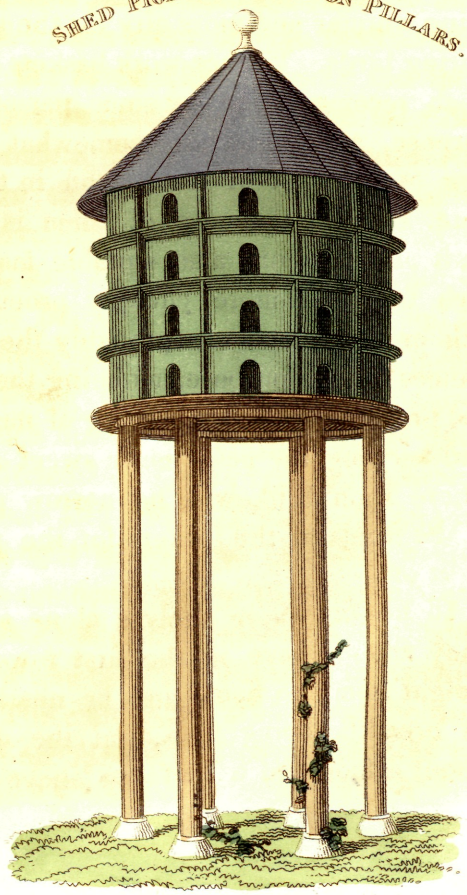


SECTION OF A CIRCULAR PIGEON HOUSE WITH LOCKERS.



DOOR, WITH LOCK.

SHED PIGEON HOUSE ON PILLARS.



London, Published by Thos Kelly, *17, Paternoster Row. Aug.23.1823.*

The nature and construction of a large circular pigeon-house, in which the outside walls are of the thickness of a brick and a half, with lockers or places for nests put all round in rows one above another on the inside, are seen in the subjoined *plate*. In the middle of it is a thick post standing up from the bottom so as to reach nearly the top, having small beams crossing it, with two ladders set against them in order to climb up to the lockers or nest divisions. A floor of wood is also placed at the height of four feet from the bottom of the house for receiving the dung of the pigeons. The number of rows of the lockers may be more or less as there may be a necessity.

The single and double form of the lockers are shewn in the *plate*.

In the former the space at A is for a door; *a* A is brick work. The space *a b* from back to front nine inches, and from door to door twelve inches; *a c* is the projection before for the pigeons lighting upon.

In the latter *a a* is the door or opening for the two lockers D D, and *e e* is a partition fronting the door-way opening and projecting from the wall B B about two thirds of the width of the locker; *g h i k* is an horizontal projection before the two lockers about four inches in breadth. There should likewise be an upright projection of equal width at each of the ends to all the different lockers, in order to prevent the danger of the birds of one set interfering or fighting with those of another; and it would be advisable that the upright pole in the middle of the house should not reach too near the top, in order to prevent its affording a resting place for owls, hawks, or other destructive enemies of pigeons.

The perfect state of this kind of locker is shewn in the *plate;* and also another sort of pigeon-house, the under part of which may be a shed for cattle, carts, or any kind of tools.

Section II.—*Methods of Breeding, Rearing, Feeding, and Managing Pigeons.*

In collecting and providing proper pigeon-stock, a more than usual degree of care and attention is necessary, as without they are in most respects suitable, little success can be expected. They are commonly had in pairs, and while young, before they have completely flown, as when of more age, it is difficult, troublesome, and sometimes impossible, to keep them to their homes. While, when taken for this purpose in the properly young state, by a little confinement, good keep, and their getting early accustomed to the place, they soon become sufficiently domesticated. The breeds and kinds of pigeons which are the most suitable in different cases have been already shown. In the young unflown broods or pairs, those of the harvest flight, of the blue field sort, are mostly to be preferred, as being the strongest for sustaining the severities of the winter season, and having the most length of time before the principal breeding season takes place. In other cases, they have usually more difficulties to encounter, and are, of course, less fit for the purpose. The number of pairs of young pigeons which will be necessary and wanted for the first stocking of a moderately large pigeon-house, will be from about fifteen to twenty or twenty-four, but fewer will be sufficient, where the birds are strong and healthy, than in other cases. Such young pigeon-stock are usually ready to begin breeding in less than six months from the time at which they were bred, where they are well kept, and under good manage-

ment; the approach of which is sufficiently shewn by the sudden deep tone in the voice of the male bird, and the greater familiarity of the female. As their habits of attachment are so constant, and they breed so constantly in their natural pairs, having an easy and peculiar means of early feeding their young, there is, for the most part, much less difficulty and trouble in raising them than in most other sorts of birds.

LAYING, SITTING, HATCHING, AND RAISING, THE YOUNG PIGEONS.

It is the usual course of the pigeon, to lay only two eggs, between the laying of which a day is allowed to pass. The sitting is then begun, which is continued for mostly about seventeen or eighteen days from the day on which the last egg was laid; the labour of it being much divided between the cock and the hen, the latter, however, always sitting in the night time; when she is relieved on the approach of the morning by the male, which continues in the performance of the business for the most part of the day. By these steady and regular means, the young are better and more exactly hatched, as to time, than in many other cases, and the birds brought forth more strong and healthy. The care of feeding the young, in the more early state, which is somewhat peculiar in the pigeon, is also shared between the two parent birds; the male having sometimes wholly brought up the young on the loss of the female; consequently, there is less risk of their being raised than usually happens in other cases. The crop of the pigeon, in the time of having young, is possessed of the power of preparing a fine soft sort of highly-nourishing matter of a milky appearance, which serves the purpose of feeding them. This the old birds, in consequence of having the capability of throwing it up at pleasure, force, as often as necessary, from their own mouths into those of their young, which are readily opened for the purpose of being thus fed. After this sort of feeding has been continued by the parent birds for about a week, and the young pigeons get more strength and hardiness, some harder sort of food is so collected, passed into the stomach, and begun to be gradually given in mixture with it, when at length the common food is only used; the young birds soon afterwards becoming capable of feeding themselves, and the old ones prepare to breed again.

The breeding and raising the young pigeon being thus easy and ready in its nature and means, the old birds are rendered capable of producing young many times in the year, as every two months, or more frequently, when well fed and managed, in some cases; but in the usual dove-house system for raising them as food, not more than three or four broods or flights at most are in common produced in the above length of time, and of these the spring and harvest broods are the principal ones, the others being often sparing and weak, probably from the want of proper keep and management: by more full attention in these respects, it, however, seems possible to raise them better and in larger quantities, as has been already suggested, without any great increase in the charge of keeping them.

Young pigeons are, in general, taken from the nests for sale in this early stage, before they are ready to fly, where they are not intended to be kept as pairs for breeding-stock, being in the best and most perfect order and condition for the purpose at such times.

FOOD AND FEEDING GROWN PIGEONS.

The pigeon is a nice, clean, feeding bird, which, though mostly considered as disposed to prefer grain as its chief food, is not less fond of pulse and seeds of many different kinds, as those of the very small bean, pea, tare, rape,

hemp, canary, and several others of the more small, cheap, and less useful sorts. These, by being kept sufficiently long, and rendered perfectly dry and hard, form an excellent, convenient, and cheap food for such birds, and when mixed with some other more common matters, of which they occasionally eat, as brewers' grains, may constitute a very proper and beneficial means of keeping such stock, saline and other such compositions being constantly in readiness for their picking at, and their houses now and then well fumigated with different strong-scented substances.

In the feeding of them, they may have their food given them in a regular manner, but not in too full quantities at a time, two or three times in the day, with the best effects in preventing their straying too much from home, and their being lost, while they will be induced to take the necessary exercise, and to breed the most readily and in the best manner. They are best fed principally early in the morning, but they may have a little about noon, or more towards night, if thought necessary. In cases where much grain is raised, there should always, of course, be proper bins and contrivances, in this intention, for keeping such seeds and pulse in, that nothing of the sort may be wasted or applied to other uses. The notion that the pigeon in the dove-house practice does not require feeding, is too absurd to be in the least regarded, as it seems to need it as much as many birds of the poultry kind, and to pay equally well for it. Besides, it is, perhaps, the only means that can conveniently be had recourse to for preventing the injuries so much complained of to the corn crops of the country.

CLEANNESS AND MANAGEMENT IN KEEPING.

These are circumstances of very material use and importance in keeping pigeons: as where there is neglect in such points, the young as well as the old birds are liable to become so daubed and fouled with their own filth and nastiness, and so beset and covered with vermin of different kinds, that they lose their proper states of feeding, thrive less, and from the stench, feculence, and very great impurity of the air in their houses, there is a loss of health, and they are apt to be much destroyed, to the great injury of the keeper. It is, consequently, necessary, in all cases, to have proper regard to the preserving the places where pigeons are kept perfectly clean and sweet. In the spring, just before the pigeons begin to breed, the nest-lockers should be carefully inspected and cleaned out, being made quite sweet and free from any sort of bad smell; as the pigeon, though much attached to its nest, may otherwise be forced reluctantly to leave the eggs she has laid, and much of the best part of that season be lost. In each late summer breeding-time, as soon as the first broods or flights are over, all such nest parts should also be rendered quite clean and free from every sort of disagreeable smell, and the whole of the dung be removed. It is equally proper and useful, likewise, in other cases, to cause the eggs that may be left to be destroyed, and the nest parts made clean, as at the termination of each breeding time, and at the beginning period of each brood or flight. In all such cases, the business of cleaning should be performed with as little bustle and disturbance as possible, and very early in the morning, as being the most suitable to the habits of the birds. Lime-whiting and washing all the internal parts of dove-cotes once a year, would also be not only highly beneficial, but agreeable to the pigeons.

In the other management of pigeons, care is necessary to prevent their fighting, as much as possible, as both the eggs and young or weak birds may often be destroyed or hurt by it. They

require to have more food given them at some times of the year than at others, as in the middle summer months, and some of the more severe winter ones, and it should always be in readiness for them very early in the morning, that they may not be prevented from taking their proper and necessary flights, and pick up such matters as may be particularly suitable to them. Whatever is necessary to be done to the houses in which they are kept should be performed in the early part of the day, and they should never, on any account, be entered late in the after part of it, as from the habits of the birds in going early to rest, they become disturbed by it, and do not soon settle themselves again, many probably not re-entering them during the whole night, but sit out, by which, when in the time of breeding, many eggs may be spoiled, and a number of young be destroyed, by being starved to death in the nests.

It is from the early spring broods and the late summer broods that the young pigeons from the nests are principally taken for market use, being usually sold at about 3*s*. 6*d*. the dozen.

As the pigeon has many enemies, such as those of owls, which they greatly dislike, and rats, cats, weasels, hawks, and squirrels, which are dreadfully destructive; it is necessary that the houses of this kind should be occasionally well examined, to see that there are no such disturbing and mischievous vermin lurking in any part of them.

Section III.—*Diseases of Pigeons.*

These small birds, like those of the poultry kind, are subject to many disordered states and affections of the body, which have much similarity to those of that class, but which, in general, are far less severe, and which for the most part only stand in need of a little change in their food, and more cleanness, to produce their removal. In the tamer sorts there is the

CATARRH, ROUP, OR COMMON COLD,

Which is produced by the sudden changes of the weather, and the streams of air to which they are exposed, while confined in different situations. Warm steeped seeds, and grains with proper warmth, may be the best, where any thing becomes necessary in removing these states; but rue and garlic in their water have been much advised by some persons.

TURN, OR GIDDINESS,

This is most probably a disordered state in these birds, which sometimes arises from too full feeding with particular sorts of food. Preventing their feeding, and causing them to fly about as much as possible, is probably the best means of restoring the birds, but the having saffron infused in the water they drink, has been strongly recommended.

SCOUR.

This state of the bowels, in these birds, is usually brought on by improper states and sorts of food, and is removed by their change into such as are dryer and harder. However, forge water, and the subcarbonate of iron, formed into small pellets with dough, have been suggested as proper in the removal of the complaint.

SMALL, HARD, GLANDULAR KNOBS, OR CORE,

These small lumpy knobs or enlargements, which are of a mixed, yellowish-red cast, in their colour, are occasionally discovered in the vents, and are said to have been sometimes formed even in the throat. When they take on inflammation and suppurate, their contents may be discharged; and in other cases they may be cut out, when they can be reached, if the birds be worth the trouble.

AFFECTIONS OF THE SKIN.

These mostly arise from filth, nastiness, and vermin, and may be removed by proper attention to cleanness, and the use of water as drink in which a little sublimed sulphur has been put; but the application of substances of the snuff and stavesacre kinds have been supposed useful in the destruction of vermin, where they much prevail and injure the birds.

STOPPAGES IN THE CROP.

Some kinds of these birds, when full grown, are liable to fill their crops too full, and in all sorts the young produce are now and then subject to have their crops rendered suddenly too full, so as to cause indigestion. The old birds, where worth the trouble, may be relieved in the manner that has been directed for the obstructed crop in fowls. And in the young birds, in the *squab*, and other early states of their growth, may have the over-distention of their crops removed, by gently stroking them with the finger in an upward manner, so as to clear them sufficiently.

WOUNDS AND EATING-SORES, OR CANKER.

The former, or wounds, when they take place on the head or in the wattle parts near it, are to be managed in the manner which has been directed for poultry; but in cases where there are sores of the eating kind, or which produce a sort of corrosion in the parts, the use of a wash of the spirit kind, or a solution of dried alum in water, with a little tincture of opium, will be necessary, where the birds are worth such attention. When wounds happen in the feet of pigeons, turpentine of the common thick kind, thinly spread on thick brown paper, answers the purpose most perfectly.

FLESHY AND BONY ENLARGEMENTS, OR WENS.

These take place in some of the fleshy parts of the birds, or about the joints of their legs; the former of which may either be opened and removed in that way, or be wholly extirpated, mild escharotic washes and dressings being applied to the parts as necessary; in the latter, a little strong mercurial ointment, rubbed on the parts occasionally, may be tried, but they are mostly considered as incurable, and the best way is probably that of fitting the birds for the use of the table.

Pigeons have sometimes other internal diseased states, but they are of little consequence, these being the chief complaints to which they are subject and exposed.

SECTION IV.—*Uses to which the Products of the Pigeon are appropriated and applied.*

THE chief products, besides those of the young, which the pigeon affords, are those of the feathers and the dung.

FEATHERS.

Though there has long prevailed a sort of absurd prejudice against the use of the feathers of these birds, there can be no doubt that when they are rendered perfectly clean, and properly prepared by stoving or other means, they are equally good for many uses as those of the hen kind. The main difference consists in their being rather more filled with dirt, which causes a little more trouble in getting them into proper order and condition for use. They are only, however, proper for being applied to the inferior uses for which such matters are beneficial.

DUNG.

The dung of the pigeon has long been considered as of a very stimulating and drying quality as manure and, like salt, not to be employed in too large a proportion, but used in a rather sparing manner in most cases, in the view of affording the best and most proper effects in

promoting the growth of crops. It is applied either as a top-dressing over growing plants as crops, or turned into the soil to assist in hastening their early vegetation and after increase. In these different intentions it should be differently prepared, in order to fit it in the most perfect manner for them. When it is designed for the first, or as hard manure, it is an excellent practice to spread a suitably thick layer of some dry vegetable matter over the floors of the pigeon-houses, suffering it to continue in that state until it becomes well covered all over to the depth of some inches with the dung of the birds, continuing the same layer manner of proceeding as long as it may be necessary. Saw-dust in the fresh dry state, and the combs or siftings of malt are probably the best for the purpose, as increasing the mucilaginous vegetable principle in the largest proportion. After this, the whole of the materials should be raked up and swept together, when the heap will soon take on heat and form a powerfully rich substance, which should afterwards be laid in some convenient dry place to be frequently turned over and rendered as free as possible from moisture, in order to its being threshed and beat out of any lumpiness that there may be in it, so as to render it, rather fine.

In this state it is proper for use in the above manner. It will go the farthest, and is probably the best, when put in with the seed by means of the drill for rape and turnip crops. It likewise sometimes becomes beneficial when sown over barley crops in the spring, as well as when harrowed in with the seed at the time of sowing them. In the above mode of preparation, from twenty to twenty-five bushels on the acre will be sufficient in the latter of the cases, and from sixteen to twenty in the former, as it is always the best and safest to have a rather under than over proportion. It is never safe to apply it in a too lumpy condition, independent of the loss there is sustained in using it in such a manner.

If intended to be turned into the soil for turnip or other such crops, it is the best to be formed into a compost heap with good rotten farm-yard dung and rich mouldy substances, the dung in layers of about two feet in thickness to the proper height and width; with a thin stratum of pigeons' dung and any dusty material laid between each, covering the sides and top part with the mouldy matters to the extent of more than two feet in the former and one in the latter. In this compost heap much heat will soon be taken on, which, as it begins to decline, the whole is to be carefully turned over, so as to mix the different materials intimately together, when it will be ready for use. From fifty to sixty bushels of this compound manure applied in the drills for such crops, will probably be equal in its effects to eight or more large cart loads of yard dung laid on in the usual manner.

This is in fact a dung which is in all cases better and more safe to be used in the compound state than in that of its simple form.

CHAPTER XIII.—LIVE STOCK.

BEES.

SECTION I.—*Nature, general Character, Economy, and different Kinds, by which a Stock is formed, Uses for which they are designed, proper Situations for them, and the most suitable Sorts of Hives and Places for keeping them in different cases.*

As from the singular industry and persevering habits of these little animals, extremely useful and necessary products are largely provided without trouble or cost in any other respect, and from what would otherwise perish and be lost, an increased attention to the culture and management of them seems to be much required, as the fear of their becoming by such means too numerous for the food which is capable of being provided for their support, is quite groundless and idle. But how far such stock are capable of being profitably extended is difficult to decide, yet there can be little doubt it may be to a considerably greater length than has hitherto been attempted, as in most situations there is a sufficiency of food ready for the purpose, and the means of effecting the business is easy and almost without risk. Besides, the management of such stock is an occupation and employment that may afford pleasure and amusement to many of the less busied ranks of mankind, as well as those of the farmer and the cottager, and thereby multiply and extend, not only the benefits, but the happiness of society.

The bee, though apparently a fierce, noisy, active, and hostile little insect, is by no means so offensive or dangerous as is too commonly supposed, as by a little determinedness it may easily be rendered perfectly manageable; and by being slightly smoked with any proper substance be reduced to a complete state of inactivity and incapability of mischief, so as to be handled in any manner that may be found necessary.

Naturalists have characterized the bee class of insects as having the mouth horny; the jaw and lip membranaceous at the apex; tongue inflected; palpi four, unequal and filiform; antennæ filiform and short; wings flat; sting of the females and neuters acute and concealed.

The *mellifica* or honey-bee has its body divided into three parts by two ligaments, the head, the breast, and the belly, and the whole is provided with downy hairs, is of a dusky cast on the breast, and brownish on the belly. The head is furnished with two jaws and a trunk, the former of which play by opening and shutting to the right and left. In the trunk there is a length and taper form, with much pliancy and flexibility, being designed for probing to the bottom parts of flowers through the various obstructions of their threads and leaves, so as to draw forth their treasured sweets: but as, were it to be constantly extended, it would necessarily be inconvenient, and liable to injury from many causes, it has consequently such a structure as that after the performance of its proper offices it can be contracted or folded up; and besides, it is defended against injuries by means of four strong scales, two of which closely ensheath it, and the other two, the cavities and dimensions of which are larger, en-

compass and secure the whole. From the middle part or breast the legs are sent forth, which are six in number, three on each side. The *tibiæ* or lower parts of the hind legs are ciliated and streaked transversely on the insides; and at the extreme parts of the feet are two little hooks of the sickle form, which have their points opposite to each other. In the middle of these hooks there is a small thin rising, which, on being unfolded, enables the insects to attach themselves to glass and the most polished substances. It is the part, too, which they employ for the transmission of the small particles of crude wax, which they find and take from flowers, to cavities on their thighs; but such cavities are only found in the working kind of bees, the other sorts being without them, as not collecting such matters. The wings are four in number, two larger and two smaller, which not only serve to carry them through the air, but, by the noise which they cause, to give notice of their departure and arrival, and to mutually animate them to their several labours. The soft hairs with which the whole body is covered are of particular use and importance in retaining the fine farina or dust that falls from the chives of the flowers, of which the wax is formed. The belly of the bee consists externally of six rings, which slide over each other, and are consequently capable of being lengthened or shortened at the will of the insect; and internally it contains the intestines, the bag of the honey, that of the acrid fluid, and the sting. The office of the intestines is not different from that in other cases. The bag for the honey is transparent, containing the elaborated sweet juices taken from flowers, and other matters which the bee discharges into the cells of the general repository for the support of the community in the winter season. The bag that holds the acrid liquor is placed at the root of the sting, through the tube of which the insect ejects the acrid fluid in a dropping manner into the puncture formed by it, which causes the pain to be much increased. The sting is composed in a singular manner of two darts enclosed in a horny sheath or case, which tapers to a fine point, near which is a very small slit opening for letting out the hurtful irritating fluid. The two darts are thrown out through the same aperture, which from their being armed with different sharp beards like those on fish-hooks, are not capable of being easily drawn back again by the bee; and in fact they are never disengaged, if the person punctured chance to start and cause confusion in the insect, but if patient and unmoved, these lateral points are clenched round the shaft of the dart, by which the weapon is rendered capable of being withdrawn, and less pain given to the person stung. It is now well ascertained that there is less danger of being stung by these insects when the mouth is kept shut, as the human breath is greatly offensive and renders them more fierce and hostile. The acrid fluid which is forced into the puncture with the sting mostly causes inflammation and swelling, which often continues for some days, but may be much prevented by instantly pulling out the sting and enlarging the opening made by it so as to promote a free discharge. The acrid fluid introduced by the sting of the bee seems to be possessed of a peculiarly pungent saline quality, from which its irritating effects arise. There appear to be eight beards on the side of each dart of the sting of the bee.

SORTS OF BEES IN HIVES, AND THEIR HABITS AND USES.

In hives of bees, which mostly contain many thousands of them, there is much which is singular and curious in regard to their nature, the manner of their generation, and the circum-

stances of their internal management and regulations, which the means that have been more lately resorted to have rendered better known and understood, by enabling the labours and economy of the community more fully to be seen and examined.

The careful examination of a hive at different proper seasons for the purpose, will discover it to be composed of three sorts of bees, the *queen* or female, the *drone* or male, and the *common* or *working* bee.

QUEEN BEE.

The *queen* bee is very different from the two other sorts, in her form as well as colour, having more length and size, and of which sort there is rarely more than one in the hive at a time, which, from being a female, and having so much respect paid to it by the other bees, is now termed the queen or mother of the whole stock; as on her depends the increase, prosperity, and stability of the hive, she being alone the breeding bee. No stock whatever can be established without being attended by a queen, though the bees be ever so numerous or eager to swarm. If by accident the queen bee is killed, the others, soon sensible of their loss, quit the hive to join the neighbouring stock, taking with them their treasure. In other cases they sometimes consume their honey, fly about their own and other hives at unusual times when other bees are at rest, and soon pine away, if another queen be not supplied. The loss is signified by a loud and continued humming, which should be a hint to the bee-master either to remove the honey that may remain in the hive, or provide the bees with another queen. When, in the latter case, the stock directly revives, and the hive is again all activity and delight.

This, the mother bee, may be distinguished by being longer, slenderer, and more neatly made than the others; by the hinder parts tapering more to a point; the belly and legs, too, are more of a bright yellow, and the upper part of the body much more dark, so as to approach a glossy black. The part beyond the wings is formed of four joints, and these into so many rings, while the *working* bees have only three, and those of a lighter colour. The more full of eggs the queen bee is, the deeper the yellow of the belly part. In her the wings reach only to the third ring, while those in the *working* sort extend to the extreme parts of their bodies. The queen bee, like the others, is armed with a sting, but somewhat shorter; yet she never makes use of it unless very much enraged.

When the internal parts of bees of this sort are nicely examined, there is constantly found an ovary filled with a multiplicity of *ova*, or small eggs; but nothing of the same kind is ever met with in any of the other sorts of bees which constitute the hive. Such is the astonishing fecundity of the queen bee, that upwards of forty thousand eggs are annually laid by her; which, if empty cells are not ready, she is under the necessity of dropping. They are little white bodies, fixed by their smaller ends to the bottoms of the cells. The cells for producing the queen bees in are framed on the side parts of the combs, and hang with the open ends downwards. When the egg has been dropped in one of them, it remains in that state three days, is then hatched, and appears as a maggot at the bottom of the cell, with a white clammy material, supplied by the working bees as wanted for its nourishment. In five or six days it becomes larger, ceases to feed, is then sealed up with wax, and after continuing in such a manner about twelve days, then bursts the cover, and comes forth in a complete state. The queen is impregnated in the

latter end of summer, in consequence of which she is enabled to breed in the spring, until she produces fresh drones. Similar to this is the manner of producing the *drone* and *working* bees, only that the eggs are hatched in the common cells, which serve the double purpose of either containing honey or brood. The cells for the *drones* are usually in the two middlemost combs of the hive; and they are deeper than those for the *working* bees. They are, in general, hatched in about twenty-one days.

It has been seen, that it seldom happens, except in the breeding-season, that there are more queens than one in a hive at the same time; for if two swarms be intentionally united, one of the queens is necessary to be sacrificed for the peace of the stock. But this is not always the case, as commonly supposed, in circumstances where stocks are from accident or otherwise united, as it has been found by the stocks of three separate hives having, from certain causes, formed themselves into a single hive, that there were three queens living in friendship together, and continuing in that state by the hive being enlarged, so that they had sufficient room. By this means nearly twice the advantage was gained to that which would have been the case in the separate state of them. Yet had not the hive been enlarged two of the queens must necessarily have been destroyed on the commencement of the breeding season. This, in some measure, shews that the bees being too greatly confined in the hives is one cause of the unnecessary queens being destroyed. It has been noticed, too, that two queens will sometimes lead a swarm from the hive at the same time; and they have been discovered to settle together without any sort of commotion or disturbance taking place. How far bees may have provided themselves with new situations before they leave their former hives, and the causes which induce them to alight on the branches of trees and other such places, are yet involved in some difficulty.

The queen bee is very constant to the hive, never, or very seldom, leaving it, unless when she leads a swarm. On trial, by limiting the range of the queen bee in the laying time, it has been found, that there were eggs deposited in the cells to which she could not come, which would have been sufficient proof against there being only one mother bee, had it not been afterwards ascertained that the *working* bees perform the office of carrying the eggs from the queen or mother bee, to the different common cells where they deposit them.

DRONE BEE.

This is the male bee, which is very dissimilar to the other two sorts, being shorter than the queen, and more thick and clumsy in the form, especially in the hind part, having a sort of downy covering at the extremity of it; but considerably larger than the *working* or common bee; the *drone* bee, in flying, makes a deep and more hoarse sort of sound. It is not provided with a sting, as not ever stirring much from the hive, nor having any share in providing either honey or wax, but living indolently, a short time, on the store of honey provided by the *working* bees. The number of this sort of bees bred in a hive is supposed to be from six hundred to a thousand, or more. They are rarely seen before the middle part of the month of May; and are forced from the hive or destroyed sooner than the beginning of the last summer one. Their only use seems to be that of propagation. For though it is found that stocks will swarm before any *drones* are seen, it is probable that some were bred some time before, being contained in the warmest part of the hive unseen; which circumstances are rendered still more

probable, as *drone* broods have been cast out in the early spring. Not long after the honey-collecting period has begun, they become destitute of their milky liquor, and are consequently discarded. From the number of *ova* or eggs which the *queen* bee contains at once in her body, a larger supply of prolific fluid is required than a few drones could be capable of affording, which renders evident the necessity of such quantities of them as are found in hives. When no further occasion is found for them they separate from the *working* bees to the sides of the outward combs, and are wholly disregarded, and left to be expelled or destroyed, and any that may remain in the stocks on the coming on of cold weather, are soon destroyed by it.

It is, in short, found on the dissection of the *drone* bee, that it affords as full a proof of its being *male*, as that of the *queen* does of her being *female*. In the former there is no appearance of ovaries or eggs, nor any thing similar to the make of the common bee, but the whole belly part is filled with variously-winding transparent vessels, which contain a white milky fluid, resembling that which is suited for rendering the eggs of females prolific in other sorts of male animals; and the whole of which *plexus* of vessels is evidently designed for the preparation and retention of this impregnating fluid, until the time of its being ejected. There being also external parts somewhat like those in other cases of animals, found in all *drone* bees, without any being ever met with in any other sorts of bees, evidently shews the difference of sex in them. They seem, from these circumstances, and their being little out, except a very short time in the middle part of the day, or employed in any other way, to be consequently suited for no other purpose than that of impregnating the eggs of the *queen* bee after they are deposited in the cells; which, while this is necessary, they are permitted to enjoy life and pleasure, but as soon as they become of no use in the hive, expulsion or destruction is declared against them by the other bees. This, too, affects equally the living bees and the eggs and maggots, the hive being cleared of the whole. When the season for increasing the stock of bees in the hive is over, and regard is only necessary to the providing winter stores, every trace of the *drones* is removed, to make room for honey. In the generating of bees, it is curious that the ovary of the queen is even impregnated for a future season by the *drones*.

COMMON, OR WORKING BEES.

The *working* bees form by much the largest portion of the stock or hive, and perform most of the labour and business of it. They are much less in size than either the *queen* or *drone* bees; live no great length of time, and are subject to be destroyed prematurely by severe labour, high winds, birds, and various other causes. The circumstance of their sex is probably not yet well decided, though from the nature of their organs, they are very commonly supposed to be of neither. The younger sort of them are capable of being distinguished from the older, by being of a lighter brown cast. They have not all the same size, some few seeming shorter than what is generally the case. In their labour they are incessant, but not perhaps particularly discriminate; as they form the combs, nurse and sustain the young bees, collect the honey and the wax, defend the hive from all attacks, and are constantly ready to lose their lives in preserving their habits, economy, order, and property. Some are, however, distinctly employed in some of these offices, as in providing the honey,—

others again in searching the flowers for wax,—and still others never quit the hive, but are engaged in different works within, such as in building the several parts of the combs, and relieving the returning loaded bees. They are particularly clean in their nature and habits, have an extremely quick and distant sense of smell, especially for honey, or honey-dew; but are not disgusted with many offensive or even noxious odours. They have a perfect sense of coming storms, and guard against them. On being first placed in the hive, they work continually, day and night, taking their repose by turns, and in the cluster manner. They readily know the bees of their own hives from those of others, and strongly resent the destroying or disturbing any of those of the same stock, falling on the offenders in a desperate manner. They have two small bags or sorts of stomachs, one for containing the honey, the other the crude wax. Their sting is a very necessary part of their economy, as a weapon of both the offensive and defensive kind, as they have equally to repel and defend themselves against their enemies, and, at a certain time, perhaps, to exterminate the *drones*. It is not less important in its use in their various quarrels. Their frequent fighting is probably to be principally imputed to their *great* desire for honey, as where it is, from the state of the seasons, not to be found in other places than the hives of other bees, they often risk their lives to get at it there. The loss of their honey, too, at a time when it is incapable of being repaired by their labour in the fields, may be another cause of such fightings. Where one of the *queen* bees is killed in such battles, the bees of the different hives unite on its becoming known to the whole, and form one community; those which are worsted departing with the victors, fully laden with the rich spoil of their own hives, returning daily with their new associates to pillage their former habitations; which causes an unusual throng for the season, at the door of the hive they are plundering; and if it be lifted up at night, when the whole are departed, it will be found quite empty of inhabitants, though a small quantity of honey may still remain in it. In case two swarms should chance to take flight at the same time, they sometimes quarrel until one of the *queens* becomes destroyed in the encounter; but which always ends the contest, and the bees of both sides form an union under the surviving queen.

It is sometimes supposed, that the bees are in the state of torpidity for the winter, but there can be little doubt that they consume as much food at that time as in the summer season, unless in *very* severe states of cold at such periods; in consequence of which they are always discovered to have a more plentiful stock reserved after severe than mild winters. In the event of the *queen* bee dying, the *working* bees continue their labours no longer than is sufficient for consuming their stores.

It is important and necessary, in many respects, to attend well to the nature, forms, and habits, of these several sorts of bees, which constitute the hives, stocks, or communities of them in all cases.

SITUATIONS PROPER FOR BEES.

In general, the best situations for bee-stocks are those in which the hives will be the least exposed to winds, while they are capable of having the greatest possible influence of the sun, especially in the latter parts of the day, as wind, in all cases, hinders bees in their labours; but the genial warmth of the rays of the sun constantly incites them to it; for though bees thrive and do well in windy elevated stations, low ones are constantly to be

preferred for the purpose. They should face the south-west as much as can be the case, the east and northern aspects being wholly avoided. It is the advice of much experience in such cases, that, where possible, an early situation should be chosen; such as a low narrow valley by the side of a brook. And the ancients considered it the best situation where it faced the south, and was in a warm valley, at no great distance from a stream of water. It is additionally beneficial, where such situations are surrounded in a plentiful manner with flowers that are in blossom at different seasons, from which the bees can readily gather their sweets, as turnips for the spring, mustard, trefoil, and clover, for the early part of the summer, and heath and other shrubby plants for the latter, with numerous varieties of cultivated and wild flower, tree, and shrub plants, in their different successions of blossoming. It is not, however, to be supposed, that this sort of stock will be incapable of answering well and properly in other less favourable situations and circumstances, as they have been found to thrive and succeed in an extremely beneficial manner, when placed so as not to be within reach of such plenty of flowers; but though they will be advantageous in almost all places, and extend their flights far in search of food, and sweet matters, they will be found to succeed better, and afford more profit, where they are situated near abundant food and pasture of the proper flowery kinds.

Where a large and profitable production of honey is to be afforded, the object of the abundance and nearness of the keep of the bees is very material, as they are thereby much sooner enabled to fill their hives. On this account, situations which are thinly stocked with plants as bee-food admit of much less increase in the quantities of the hives than those which are more productive in such keep for them, though there are yet probably few situations which will not allow of a considerable increase of them, as the country is in general but thinly provided with such stock. The increase in the quantity of bee-stock, which is wanted in any district, may be known with the most certainty from the whole of the amount of the produce which a good season will afford, it being a sort of standard for the purpose. In good situations a great increase of bee-stock is commonly necessary, in order to produce the most individual and national advantage.

It has been well observed that large commons of the heathy kind, bordered with or near woods, are very productive of bee-food, as not only abounding largely with wild thyme, broom, and numerous other flowering plants in their natural states, but with great plenty of farina and dews of the honey kinds, many of the former of which continuing long and late in flower, and are the most extensively useful, as being those which the bee particularly delights in. In the trees and plants, which are still further beneficial in supplying the bee with its stores, are the sallow, the flowering lime, rosemary, Spanish broom, borage, bugloss, mignionette, lemon thyme, and the common wall-flower.

It can hardly be doubted that by attention in respect to the proper sorts and supplies of these and other plants for keeping bees, and to the occasional change of their places as the nature of their keep may change, much improvement and profit may be produced in the keeping of such stock.

SORTS OF HIVES AND STANDS MOST USEFUL.

There has been much dispute about the nature of the materials which are the best suited for the forming of bee-hives, but when the whole of those which have been proposed at

different times have been examined and compared, it will probably be found that straw is the most proper for the purpose, as combining in itself the properties of lightness, dryness, closeness, cheapness, and warmth, together with that of being peculiarly agreeable to the nature and habits of the bees. In this use such straw as has not been threshed, shivered, or any way broken, and which is of the rye or wheat kind, is by much the most to be preferred, as being of much length and making the most smooth and clear inside surfaces in such cases.

Bee hives are differently constructed, as the difference in the manner of taking the honey which they are to contain may be. In the common method, where the bees are to be destroyed, they are usually formed with upright sides and semiglobular tops, so as to contain about the quantity of a bushel of any sort of grain. They are constructed with straw twisted together and bound into small ropes, which are sewed or fastened to each other by strips of the bark of the bramble-tree. But as such hives as these are under the necessity of having the bees wholly destroyed in order to take their honey, which is greatly cruel and perhaps somewhat detrimental to the improvement and profits of bee culture, other sorts of hives have been contrived, by which their honey can be taken without the destruction of the bees.

The following methods of constructing hives and taking the honey of bees have been practised on a large scale with much success, in some of the more northern districts of the kingdom. A sort of hive or hoop is formed of rye straw in its unbroken state, having the heads cut off. In this manner a sufficient number of such hive hoops are made, each of which is ten inches in height, and fourteen inches in width within, the sides being carefully formed perfectly upright, and so as to be each of exactly the same dimensions every way, and to fit quite close and stand firmly when put upon each other.

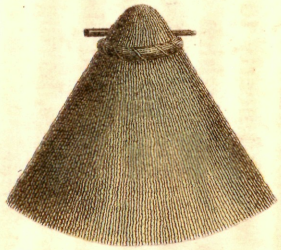
The straw covers are made sufficiently large to extend an inch over the circumference of the hive-hoop, and as flat and even as possible, to prevent the bees working above the wooden top, there being a sheet of paper put between them as a further security. The wooden top is to be fastened upon the top of each hive-hoop by means of two long nails before it is used, that part of it which has the openings for the knives being placed to the back of it; and when the first hoop is filled with honey, or the bees are in want of room, another hoop is to be set upon it, being careful to have the knives put in before the straw cover is removed, withdrawing them again when the hoop is fixed on.

On every further fresh hoop being placed on the hive, the moveable resting board is to be fixed in such a way as to admit the free entrance of the bees at all the openings for the purpose.

Whenever the honey is to be taken, the bottom hive-hoop is to be first taken, there being always a full hoop left in the autumn as supplying the winter keep of the bees when necessary. In this way much honey may be taken, and the bees be preserved perfectly strong and healthy, so as to afford other swarms, and similar quantities of honey at other seasons. But as in these cases less honey is left as the winter-food of the bees than in the usual mode, it is necessary to feed them, as there may be occasion, with such food as coarse soft sugar rendered fluid by being dissolved in beer, and reduced nearly to the consistence of treacle, a little of which being regularly given every morning in the feeder, which is a piece of oak board with holes bored in it to the depth of half an inch, and placed on a raised stand near to the hives, having a wooden cover to keep out the wet.

IMPROVED BEE-HIVES & THEIR APPARATUS.

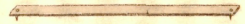
STRAW HOOD.



HOOP STRAW HIVE.



Form of bars & fastening pegs.



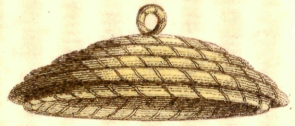
Knife.



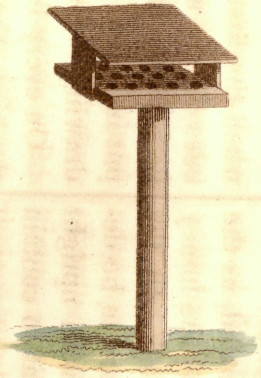
Tin Entrances.



TOP COVER.



FEEDER & STAND.



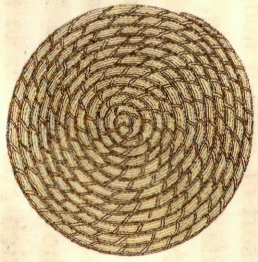
HUISHE'S IMPROVED STRAW HIVE.



RESTING BOARD.



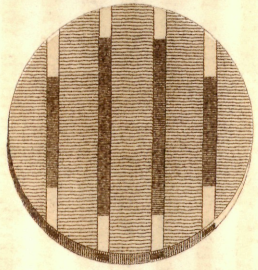
HOOP HIVE COVER.



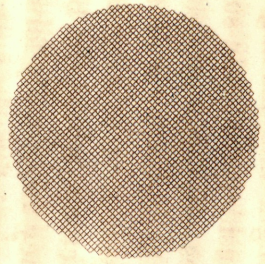
Sliding Knife.



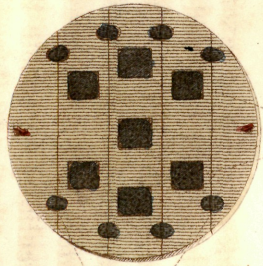
WOODEN TOP FOR HOOPS.



GAUSE COVER.



DIVIDED MOVEABLE COVER.



Openings, overlaid with perforated tin plates.

Hinges.

London, Published by Thos. Kelly, *17 Paternoster Row, Sept.13, 1823.*

Over the whole a hood, which is made of a bundle of straw by being tied firmly together at one end, is put in an inverted manner, the long ends falling over the tied part, a small iron or wooden hoop being placed upon it to keep it in its situation by having a strong skewer thrust through the knot, covering the top over with some mortar, which gives weight and keeps out the wet. See the whole of these several parts in the subjoined *plate*.

In this *storying* or *super-hiving* method it has been found in practice that three hives are necessary for each stock of bees, and that the most convenient size of them is that of half a bushel, as affording sufficient room, and allowing honey to be taken more early. That they are best to have nine inches in height, and twelve in width in the clear on the inside, without the top; one cover being sufficient for the three hives. The hive-hoops, as soon as made, should be set separately with proper weights on them, on level even boards, to render them the most exact and suitable to each other. Each of the hives should have proper smooth wooden tops to them, and there should be suitable floors of strong, even-planed yellow deal for them to rest on, as it is convenient to have spare ones in many cases, but one will serve the three hives.

A hive, however, which has many advantages over this, or perhaps any other, in affording the means of taking the honey either partially or wholly, and preserving the lives of the bees, in rendering the combs in a constant state of successive renovation, and in preventing the honey from being injured, as well as in other ways, has lately been invented. It is constructed in the form and manner as described below.

It is formed of straw in the state as above, and has the shape of the garden flower-pot, being somewhat wider at the top than the bottom. There are seven bars placed in an equidistant manner upon the top part of the hive, which has there a projecting rib of straw for their resting upon, and which are fastened down by means of nails or pegs, but only so as to be easily drawn up. Over these bars a piece of net-work is extended which prevents the bees from working between them, as they only work to what is solid. The covering board, instead of being in a solid piece, is divided into five equal parts, which are joined to each other by small hinges, the three middle pieces having seven square holes cut in them, in the centre one three, and in each of the others two. These holes are covered with tin plates, which have small perforations in them for allowing the steam of the hive to pass. These means not only prevent much inconvenience in depriving the bees of their honey, by not having to uncover the whole, but by causing the vapour from the hive to be condensed in the top part of it, and thereby avoiding its fall upon the combs by means of the board which rests between. The hive is covered by a moveable straw top, which can be lifted on and off at pleasure. Before using it, the hive is to be rendered quite smooth and regular on the inside, and great care taken that the bars are firm, and the top well secured to the hive part. See Huish's *improved* straw hive, and the different parts of it, in the *plate*. The entrance to this hive is of tin, and is capable of being used for other sorts of hives, as well as on many occasions where the contraction or dilation of such passages are essential to the benefit and security of the bees.

STANDS FOR BEE-HIVES.

Many different methods have been made use of for placing bee-hives upon as stands, such as wooden benches, houses variously formed, and

flat stones. The two former are improper, and greatly inconvenient in many respects, and the last has the disadvantages of being too cold in the winter season, and too hot in the summer time. The most suitable material for this use is probably that of wood of the more solid kind formed into a stout single smooth stem under the head or stand part, as seen in the *plate*. It should be raised to about sixteen inches or two feet from the surface of the ground in order to guard the more effectually against the entrance of mice and other such vermin into the hive. By this means each hive will stand so as to be quite separate from the other, which has many advantages and conveniences in the managing of such stock. The most useful distances from each other may be from about two to three feet, there being sufficient space behind for all necessary purposes, being always kept some yards from walls and such kinds of fences, as well as from hedges, which may, however, sometimes be beneficial as screens.

The head stool or top board on which the hive stands should be made of well-seasoned thick oak or deal, which is not in danger of warping by the heat of the sun. The whole should slightly incline forward, to take off the wet. It is always proper to have such hives and stands ready in sufficient quantity, as it will save much trouble and loss.

The hive-stocks, where numerous, should be divided and set in distinct parts, not too many together, being constantly well secured from being blown down by storms or other causes. In the language of the bee master, *double* or *treble* hives of those insects are termed *colonies*, and they have the title of *stocks* generally when at the close of the season; but in all cases from the time of being hived until the closing of it, *swarms;* after which, they have the names of *colonies* or *stocks*, as they may be situated in the above respects in regard to the nature of the hives. When a swarm has thrown out a *swarm*, that then becomes a *stock*, even though it has only been just hived.

SECTION II.—*Providing Bee-Stock, hiving the Bees in different Cases, and the Manner of their working and forming the Honey-combs, Wax, and other Substances of the Hives, with some other Circumstances.*

THE most proper time in general for procuring bee-stock is that just before the main season for taking the honey of bees at the latter end of the summer, as there is then the greatest choice of hives, but it may be well done at other times. They should always be fixed on and chosen by a person fully experienced in their nature and properties, who in the middle part of the day should examine and compare the circumstances of them in the different hives where they are placed, as to the number of the bees which enter loaded in their legs with portions of yellow matter, the extent of the drones, the activity or bustle which prevails about the hive, and whether the bees soon leave it on coming out, or hang about it and re-enter; their readiness to repel intruders, and the quantity of the bees which rest fanning themselves about the door of the hive; as the greater the number of these are in all cases, the better the hive. The state of the hive itself is also to be well attended to in order to see that it is new, well seasoned, and perfectly free from damp. When any hive has been determined upon as proper, it is then to be loosened in a gentle manner from the board on which it stands, so as not to be shaken, and be turned up carefully to inspect its internal parts, the bees being first smoked, where necessary. The appearances which it should present are these;

that it be crowded with bees, have the combs of a fresh paleish-yellow cast, and not black or dark coloured, the side-combs be well filled with honey, the number of queen-cells few, the smell from it pleasant, and not strong or rank, no spotted liquid appearances to be seen upon the hive-board, nor any large number of yellow waxy particles visible on the stool part, and the wing ends or points of the bees not torn or in a ragged state. The usual method of tapping round the hive by the fingers gives but a very imperfect notion of its goodness. It is very material to have the stocks which are provided large and full, as small ones only deceive the expectations of those who may have them; therefore, where one cannot be had sufficiently large, two or more may be united, so as to constitute a strong stock.

The next circumstance of importance is the removal of the stock thus provided, which should always be performed as soon as possible afterwards, the evening, when the whole of the bees are returned to the hive is the most proper time for the purpose. Then, where the bottom board of the hive can be taken with it, the entrance must be well stopped up with clay or some other suitable substance, but so as to let the bees have air; but where the hive is so situated with others, which is always improper, that it cannot be removed as above, a proper board must be placed on the ground directly before it, upon which it is then to be lifted in a very gentle manner; but as from such inconvenient situations, as soon as the hive is lifted off, a large number of bees will be left on the place where it stood, which are not to be lost, the bottom part of it is consequently to be first held level with the bench from which it was taken, and all such bees be swept into it by any proper means, and then be set upon the board, the entrance, and all other crevices through which a bee can get out, being carefully fastened up and secured. Then, in either case, the hive is capable of being removed by having an old sheet or any other such cloth well fastened round it, being conveyed by the hand, or upon the head, or in any other suitably easy manner. After being thus removed, the hive should be left at rest for a little while for the bees to settle in it again, the stopping from the door being taken away to let them have free air and prevent their destruction; it is then to be placed in the proper aspect on the pedestal where it is to remain, and on the succeeding day be plastered round the bottom part in a sufficient but rather thin manner. Plaster is much better than any moist substance, which may injure the hive, and is liable to crack when dry, and fall off.

In cases where small stocks or swarms are provided in the spring season, on their being brought home they should immediately have an empty hive put on them, as by being thus doubled at first, the trouble of it afterwards will be prevented, and advantage be gained in other ways.

CHANGING THE HIVES.

The hive being ready, and in proper order for receiving the bee-stock, the weight of it is to be fixed to it in this state; and when full with the bees, should be again taken, by which the exact weight of the swarm may be best determined, allowing for the difference in weight between summer and winter as four to three, and the justest estimate afterwards be thereby formed of the amount of honey that may be in the hive, which may serve as a guide in taking it at the proper period. It is not useful or necessary, though common, to rub the inside of the hive with any thing of the bean leaf, syrup, or honey kind, as without it be agreeable

to the bees, which is not always the case, all such substances can be of no avail. The last may, however, be had recourse to where the bees are incapable of being shaken into the hive from the firm nature of the situation on which they are fixed, and their being forced to rise and have the hive put over them for the purpose, as it may be serviceable in enticing them into it. Human urine has nevertheless been lately suggested by Mr. Huish as very beneficial for sprinkling on the inside of the hive before the bee swarm is put into it, as being from its saline and saccharine qualities particularly agreeable to them.

The common method of hiving the bees is that of shaking them into the hive when they are well settled in the evening; and then after its being put on the stand, to fasten it round the bottom thinly, as already seen, with plaster, and, in the improved hive, round the cover too, as preventing the earwigs and other such insects from getting in at the top. There is also a covering to be put over the whole, to prevent the effects of the sun's heat in melting the combs, as well as to hinder the wet from penetrating into the inner part of the hive. The bees having taken properly to the hive, as will be shewn by their soon passing into it loaded with small pellets of yellow substance on their legs, it is not to be any more disturbed until the time of taking the honey.

It is useful in removing bees from hives of the common kind to those of the *improved* sort, to cut holes about three inches square in the top of the former to form passages for the bees, placing the *improved* hives upon them, and then plastering them all round the bottoms and entrances, securing them well from being thrown down, when in a short time the upper ones will be taken possession of; the entrances of which should then be opened, and those of the lower ones closed, and after the higher hives are filled with combs, the inferior ones be wholly removed; but to effect the driving out of the bees completely, they must be smoked from their entrances. The old hives are to be taken into some out-place to see if the queen bees are in them, when, if the case, they and all the bees continuing in them are to be picked into a cup or cloth and set at the entrances of the new hives, into which they soon get.

In transferring stocks of bees from one hive into another, it is sometimes useful that that which has the swarm be inverted into a sufficiently spacious vessel which is convenient for the purpose, across which two strong flat rods are to be laid, and the empty hive placed over it on them, stopping the joining by means of a cloth, when before morning the bees will in most cases have ascended into the upper hive; but should not this have been the case, they may be left in the same state a day longer, to give them a further trial; when, if they still remain indisposed to rising, the joining parts are to be completely stopped up, and the lower hive be beat round with small sticks until they are forced to ascend, which is known by the great buzzing noise in the upper hive. And in the case of two swarms having been provided at the same time, a cloth may be spread on the ground, and a stick laid across it; then by striking the edges of the separate hives strongly upon the ground close together, the bees will drop out in lumps, and may be secured by having an empty hive set over them so as to rest on one edge of the stick, the whole being covered by a proper cloth. In all such cases where the bees do not rest quietly when they have been got into the hives, they are to be smoked in a proper manner.

METHODS IN WHICH BEES WORK.

The manner in which the bees work in form-

ing the several substances which constitute the labour of the hive are very different, curious, and interesting. In beginning their operations they form themselves into different divisions, some of which go out to provide materials for forming the necessary structure of the several parts; others work upon them so as to mould them into the rude rough state of the first forms of particular parts, as the size and divisions of the cells of the comb; still others take care to put the angle parts of them right and to give them the proper polish and perfection, removing the portions of wax that may be unnecessary; and there are yet other divisions which employ themselves in bringing food to the labouring builders as being more heavy and tedious work than the polishing. The work is begun at the top part of the hive, and continued downwards to the bottom, and from side to side, making it firm and solid by the use of a sort of tempered gluey wax. The honey-comb is formed in the hexagonal manner, which has the advantage of including within the same extent of surface, a larger space than any other form, besides preserving those of the square and other shapes. Bees are almost incredibly expeditious in the performance of their labours; as though in spite of the great exactness and beauty of the work, their unwearied industry is such, that in a very short time they will finish cells sufficient for containing many thousands of these insect inhabitants.

The particular manner of their working is difficult to explain, but in executing it some bees may be seen bearing in each of their members a small piece of wax, to be conveyed with readiness to the parts where other bees are at work upon the combs; which, as soon as they have reached, they fasten to the work by means of these members, applying it occasionally to the right and left; but each single bee is only engaged for a short time at once in this labour, another soon taking its place. While one portion of the bees are employed in constructing the cells, others are engaged in completing those that have been newly modelled, finishing the sides, bases, and angles, in so exquisitely neat and thin a manner, that three or four of such side parts placed upon each other, have not the thickness of more than a leaf of common paper; and as the entrance of the cell, which is suited to the size of the bee, might, in consequence of its thinness, be liable to break, that part of each cell is strengthened by a border of wax.

It has been seen, that the bees which build the cells, work but a little while at a time; it is, however, different in respect to those which polish them; as they continue to work long, and with greater readiness, never relaxing in their labour, unless to carry out of the cell the small portions of wax taken off in polishing; and to prevent this wax from being lost, there are other bees which stand ready to receive it, and convey it to some other part where it may be used.

The different cells have each two rows, which are opposite, with their common bases. The thickness of each comb is somewhat less than an inch, and, of course, the depth of each cell about five lines, yet the breadth of each is little more than two. All the combs are formed with cells of this size, except a small number in particular parts of the hive, which are larger, and suited for the depositing those eggs in, which are afterwards to become *drone* bees. In some other parts, also, there are a few which are larger and differently formed, and situated as already seen.

HONEY.

The manner in which the honey is collected is necessary to be explained. In the bottom

parts of most flowers, there are certain cavities which contain more or less of the refined particles of the sugary juices of the plants from which the bee prepares the honey. These juices the insects suck up by the parts of them suited for the purpose, drawing them into the bag, stomach, or apparatus for preparing the materials, which, when they have taken in and prepared a sufficient quantity, they return to their home, and discharge it into the common receptacle in the hive. But besides this, there is another means of supplying it, which is that of collecting and drinking up the liquid substance termed the *honey-dew*, from the trees and plants which contain it in sufficient quantity.

When the cells of the combs of the hive destined for receiving the honey are full, the bees close some of them up with wax until they may want the honey, the rest being left open, to which the whole of them resort, partaking of the contents with much moderation and economy. In this way the unnecessary quantity of honey is secured, which is the best, the other being more fluid and watery. What is further necessary, with respect to the honey and wax, will be considered afterwards.

WAX.

This is a substance which is prepared by the organs or apparatus destined for the purpose in the bee, from the fine pollen, farina, or dust, which is formed at the points of flowers. This the insects collect, and with their front feet and other parts, form into little rolls or balls, which they transfer in a separate manner to the feet of their middle legs, and from thence to the middle joints of their hind legs, where there are small spoon-like cavities for receiving it. These balls or little pellets not being the true or real wax, but the substance which contains it, there is a necessity for their being elaborated and prepared by the proper organs of the bee, before they become reduced into the state of wax; consequently, after the bees have brought home the material in its crude state, it requires to be taken up into their organs, and reduced into the perfect state of wax, which is done partly by the bees which collect it, and partly by the other bees. The inducement to which, especially when the swarm is first hived, is the necessity of procuring a speedy supply of real wax for forming their combs. In cases where there is no immediate occasion for wax, the matter is laid up in store by the bees, to be kept for future use. When the waxy substance has been prepared and changed into real wax by the process of the bee, it is brought forth as they work it up into the combs; as it is only while it is soft and pliant by such means that they are capable of fabricating it in a proper manner. The crude wax has various casts of colour, arising from the difference of the flowers from which it has been taken.

BEE-BREAD.

Besides gathering crude wax in the above intention, it is also provided by the bees as food, as is evident from the want of it after the combs are formed. They are seen, too, even in old hives, to be running in large numbers, loaded with such matter, to deposit it in particular cells; and it may be supposed, that the consumption of it is very considerable, on account of the quantity collected being so great in a hive, while that of the real wax in it is so very trifling. When this substance becomes too old and stale, it has a very unfavourable effect on the health of the bees, often causing disease in them.

PROPOLIS.

This is still another substance provided by the bee, with which every crevice and part of

the hive is closed and fastened up. It is a sort of resin that is easy to be wrought out, and which is more tenacious than wax, and more readily fixed. It seems to require little or no preparation, being a resin which is collected from the different parts of trees and shrubs, and made use of in nearly the state in which it is found. It becomes very hard in the hive, but softens by heat; in which state it usually diffuses an extremely agreeable smell. Outwardly it appears of a reddish brown colour, but inwardly it resembles wax, and is somewhat yellowish. When the bees use it, it is soft and pliable, but it gradually hardens, and becomes in time harder than wax. It serves also for coating over improper bodies, and preserving them in that state without injury in the hives.

PARTICULAR CIRCUMSTANCES OF BEES.

Young *queen-bees* become capable of leading swarms from the hives in which they are produced, commonly in a few days after they have appeared in the *winged* state.

As soon as hives become too much crowded by the increase of young brood, a part of the bees in them find themselves inconvenienced, and endeavour to provide a more suitable habitation; for which purpose the most forward young *queen* is singled out. A new swarm is, therefore, constantly formed of one *queen* at least, and of some thousands of *working* bees, with a great number of *drones*, the former of which are both young and old. They have scarcely reached their new situation before the *working* bees have provided it with food and other necessaries for their work, as they not only take care to have cells ready for the honey, but for the *queen* to lay her eggs in, as she is, from their natural habits, known to be in haste for it; which causes their producing much length of combs in a little while, and the making of more wax in the first fortnight afterwards, when the season is favourable, than is done in the rest of the year. At the same time there are other bees busy in stopping the holes and crevices they find in their new hive, to guard against the plunder and destruction of vermin, as well as to protect them from too severe cold, as it is essential that they be sometimes rather warmly lodged and kept.

In taking their repose, and in swarming, bees have the singular custom of gathering themselves into a sort of mass or heap, and of attaching and hanging to each other by their feet, which, as the heaps are sometimes large, some of them must have no little weight to support; yet, from its being their usual economy or habit, it must be that which is the most proper and agreeable to them.

In cases where swarms of bees divide into two or more parts, which settle in a separate manner, it is a certain mark of there having been two or more *queens* among them. And as one of the divisions or clusters is usually larger than the other, those of the smaller mostly detach themselves in a gradual manner, until such time as the whole, with their *queen* or *queens*, join with the larger cluster. When, as soon as the bees are hived and settled, the unnecessary *queen* or *queens* that may be present must be destroyed, in order to produce peace and quietness in the hive; in which circumstances, many other bees are often killed, the bodies of which may sometimes be seen on the ground near the hive. The bees constantly preserve, in such cases, the *queens* which are of the most fine reddish yellow in their colour; as prolificness is the great cause of preference in these insects, and the nearer such bees are to the time of laying their eggs, the larger and more shining with yellow are their bodies. Queen

bees are the *mothers* of the hives in all cases, and should, of course, have that title given to them in all circumstances.

Section III.—*Necessary attention to Bee Swarms, and their Swarming and Management.*

Some degree of particular care and attention is proper and necessary to hives of bees, from the beginning of the autumnal months through the whole of the more inactive periods of their inhabiting them, until the renewal of their labours again, and the forming of new swarms in the spring and summer seasons. In the course of those months which close the autumnal part of the year, there should be much regard paid to the proper feeding and preserving of the hives that may be in a weak state, as shewn under the *head*, "Feeding and preserving Bees in the Winter." The entrances to the hives should also be lessened, so as to allow only one bee to pass at a time, as well as every care be had to cleanness, and all sort of dampness be removed from them, as it is greatly hurtful to the bees, and may prove their destruction. Bee-stocks should not in general be kept too warm at this season, as it increases the consumption of their food, and to such hives as are poorly provided with it, must increase the mischief, and render their destruction more certain and expeditious. The bee has the power and means of remaining long in the torpid or benumbed condition from cold, without having its vitality destroyed, though it may seem to be dead. This may, in some intense states of cold, have caused stocks of bees to be thrown away, from not suspecting that they were still capable of returning to life. As this season becomes more severe, there is little to be done to the stocks, except that of preserving them safe from the effects of storms, keeping them clear from snow, and restraining the bees from leaving the hives, as the less they are disturbed or exposed, in cold weather, the better, their natural heat, by which they are mutually preserved, being the least taken away.

In the very early part of the ensuing year, regard is chiefly to be had to the health of the bee-stocks, the letting them have fresh free air when proper, and the removing any snow that may fall on them, so as to avoid its melting; the first of which is shown by the bees flying much about in great numbers on fine days, as well as, in some measure, by their displaying resentment on being exposed, and making a rustling sort of noise, and a sudden jerking of their wings, as if inclined to fly. On the bees becoming more roused from the state of torpor as the season gets more advanced, and there is greater want of food, from the increased consumption of it, it will always be useful to let bee-stocks have some proper food given them on fine days as necessary, as such partial feeding will be beneficial, not only in hastening the swarms, but in forwarding the *queens* in the laying of their eggs; due respect being had to the removal of all sorts of dirt or filth, and the proper enlarging and contracting of the entrances to the hives being well attended to. Bees should never be suffered to have water from the melting of ice or snow near the hives, as it is greatly hurtful to them. Where there are barren *queens*, or unfruitful hives, from the want of impregnated eggs of the preceding season, the bees of such hives should now, without delay, be united with the weakest stocks. In feeding at this time, the evening is the best, and the plunder of strange bees is to be well guarded against, removing what remains always early in the morning. The entrances to the hives should at this period be properly enlarged, and

the bees be kept more warm, as expediting the production of their young. As the middle and latter end of the spring begin to take place, the stocks of the hives will sometimes be much increased, and there may be *drones* appearing, which the sooner that is the case, and the more *early* will be the *swarms*, as they are seldom long in being seen afterwards. Every thing necessary for them should, therefore, be in readiness, and in a proper state for the purpose; queen wasps, and small, twilight, speckled butterflies, which now get into hives to lay their eggs, being as much destroyed as possible. When the drones have been some time apparent, and there is an unnecessary quantity of bees, activity and heat in the hives, with a clustering of the bees on the outsides of them in the night time, additions to the stocks are hourly to be expected, and no care or attention should be lost sight of to preserve them. As soon as the swarming seasons in the concluding spring and early summer months are over, there will be a necessity for preserving hives from the attacks of strange insects of every kind, the too great action of heat, and the decay of them in particular cases, those hives being the best where the drones are expelled or killed the most early. The *taking* of the honey and other matters, in some way or other, will now, also, as the summer advances towards its termination, become an object of much consideration, some of the modes of which may be seen below under that *head*, with the improvements for saving the lives of the bees.

It is not improbable, that in most cases previous to swarms taking their flights, places for their depositing themselves in are provided by some part of the bees of each stock, as would seem clear from small clusters being discovered in particular situations; which may often be the reason of the difficulty of keeping them in hives, rather than any dislike they may have to them. The most usual time of the day for such an event taking place, is from about nine o'clock in the forenoon to two in the afternoon, when the weather is clear and fine; it rarely or never happening in strong winds, storms, or in a much overcast state of the sky, but frequently on sudden sunshiny gleams breaking out; when, however, in such states, there is once a clustering discovered amongst the bees, they are never to be lost sight of in the above middle space of the day, until the swarms be really on the wing. The departures of the swarms, in all probability, depend on the young mother or queen bees; but what is the cause of them is involved in much doubt, as it is not ascertained whether they are expelled, or leave the hives in a voluntary manner, though the former appears the most consistent with the economy and habits of the bee; consequently, no certainty as to the exact time of the swarms coming forth can be formed. There is frequently a sort of indolence shewing itself in the bees for a time before they swarm, few bees passing into the hives with their usual activity and bustle, but, on their alighting, instead of directly passing into the hives, keep about the entrances for a time, and then again fly away. The swarms, having once taken wing, are never to be lost sight of until they begin to settle again; but the absurd customs of making ridiculous noises, and throwing water or dust among them, are to be avoided as of no use, but greatly mischievous in preventing their settling properly.

The first flights of swarms are rarely to any considerable distances from the hives, and are probably only intended as collecting the whole stocks together into separate bodies, when they may take their departures to the particular chosen places which have been fixed on, such as hollow trees, holes in buildings, and other

places of the same kind; but from being stopped in their progress, and having suitable coverings provided for them, together with that peculiar timidity and suspicion of danger in the mother or queen bees, on their being openly exposed, the swarms commonly take to their hives, and begin their labours without delay.

In the securing of swarms in the hives, the business must be effected according to the circumstances of the cases where the bees settle, which are very different. Where the hives can be held under the swarms, they may be readily secured, by either being shaken into them from the places where they rest, or by the parts containing them being cut away, where they are in a proper state for the purpose; but where swarms settle on solid matters, as the thick stumps of trees, or other such substances and places, more difficulty and trouble will be experienced, yet they may mostly be wholly swept off them into the hives by the bold use of the wing of a fowl, good care being taken that none of the small lumps of the bees fall to the ground or are crushed, as they may contain the mother or *queen* bees, which are essential to the hives. In cases where swarms settle in different clusters, the difficulty of securing them in hives is still further increased, as it may be uncertain whether each does not contain a *queen*, which may render every cluster a distinct swarm. Should this be the state of the case, the experienced bee keeper may seek out and let each mother or *queen* have her proper proportion of bees, and as many separate swarms be formed, which may answer well when early formed; but in general it may be better to have all the clusters swept into and secured in one hive, the bees being left to choose their own *queens* or mother bees.

Bee-swarms having been thus secured in the hives, they should be put on proper boards, and remain in the situations near where they settled, until the evening, when they should be carefully taken away, and placed on the stands in the bee-grounds, care being had not to let them be too near the hives from which they came.

The circumstances which chiefly influence the forming of swarms are, the early and great fecundity of the mothers or *queens*, as providing the vast infant-increase which compose the hives, the consequence of feeling which naturally impels the bees to swarm, in spite of every thing that can be done to prevent it. Swarms constantly consist of a mixture of old and young bees. The breeding of the young bees takes place sooner or later, as the fruitfulness of the queens, the amount of the bees of the stocks, and the favourableness of the situations and seasons, may be. The greater the number of bees in the hives, the more the increase of heat for enabling the mothers or queens to begin breeding earlier than in other cases will be. Whenever bees begin to bring into the hives *farina* or yellow balls on their legs, it is certain that the mothers or *queens* have begun to breed. Much length of cold or moist weather retards the bringing forth and increasing of the young bees, and is the cause of their being much destroyed, especially in weak stocks.

Mother or queen bees are not equally prolific; some breed slowly or not at all, while others produce speedily in vast quantities. Steril *queens* should constantly be destroyed, and fruitful ones put in their places. The most beneficial time of swarming is in the latter end of spring, and the very beginning of summer. Where bees have plenty of *farina*, they are commonly the most active and forward. Large early swarms are usually the best. Second, and still more succeeding, swarms, are mostly im-

proper to be kept singly as stocks, as having too small quantities of bees to properly serve the several purposes. They are better united, so as to form sufficiently full hives; and where the parent hives are too much weakened by frequent swarming, the small swarms should be restored to them, and more room be given in the hives.

SECTION IV.—*Methods of taking the Honey and other matters of Hives, without destroying the Bees.*

THOUGH the general practice in this country, in taking the honey of hives, is that of suffocating and destroying the bees, by means of the fumes of burning sulphur placed in holes underneath them, there are other more humane and beneficial modes of effecting the purpose lately had recourse to, especially those by means of *super-hiving*, and the *improved construction* of the hive, as seen in the *plate*, the latter of which is the most ready, useful, and convenient, for this intention, as well as in different views of managing bee-stocks, of any that have been discovered, so as to facilitate and improve bee cultivation in a high degree. The time of taking the honey is usually somewhat towards the latter end of the year, when the collecting of it has ceased by the stocks.

BY STORYING, SUPER-HIVING, OR TRANSFERRING THE BEES.

This is the manner of accomplishing the taking of the honey, by setting one, two, or more, hoops on the straw-hoop hive seen in the *plate*, so as to provide room for the bees to ascend, when the honey of the undermost hive may be easily taken without injury to the bees; and which is supposed to have many advantages in the increase of the stocks and honey, by providing more space, and never suffering the bees to be at a stand for the means of extending their combs, as fast as the honey or brood may require it. Nor will there, it is supposed, be any danger of swarming being prevented, as generally believed, or too great increase produced in the stocks. Besides being beneficial and profitable in these respects, it has advantages, it is thought, in avoiding the disgusting and wasteful practice of suffocating the bees; in relieving swarms when too large; in preventing the idleness of the bees in their lying out of the hives; in the uniting of swarms; in causing more cleanness and healthiness; in the better preserving the bees from the danger of mice, moths, and other insects, by the hives being more frequently shifted; in providing proper occasional enlargement in the hives; in being better provided against bad seasons; and in taking less room in the bee-grounds than common hives. See the *head* " Sorts of Hives and Stands," above.

BY DEPRIVATION, OR THE IMPROVED HIVE.

But though the above method is much preferable to that of wholly destroying the bees, it has several inconveniences attending it, and is much inferior to that by *deprivation*, or the *improved* hive manner of proceeding, in securing the honey of bees.

When it is thus to take place, the operator is directed by the inventor to be provided with these necessary articles, which may be had of the agents of the Apiarian Society, in different places; a pair of bellows, to which a fumigating box is attached, for forcing the bees from the part of the hive from which the combs are to be taken; a bee-veil or dress for preventing the stinging of the bees; knives for cutting away the combs from the sides and tops of the bars of the hives; a pair of nippers; a hammer for drawing the nails

from the hive and folding wooden top; a lamp with a lighted candle in it; mild tobacco, but the leaves of the lime-tree, half dry, are much better, as being less in danger of injuring the honey in the combs; the wing of a fowl for brushing the bees from the removed combs; and proper plates and dishes for putting the combs upon. He is then to perform the business in a cool and collected manner, without improper bustle, being as little as possible in the fronts of the hives; the most proper time of the day being from ten to twelve o'clock. He is first to draw out the nails which fasten the top to the hive in a gentle manner, so as not to disturb the combs, and when the top of the hive and folding wooden top are removed by taking away the fastenings, the fumigating material is to be set on fire in the bellows, and on throwing out smoke plentifully, the first division of the wooden cover is to be lifted up, which will directly shew the positions of the combs; the bees will also appear, but without at first giving any interruption, if not breathed upon; they are then to be smoked, when they will instantly depart to the bottom of the hive, and leave the combs bare and in full view. Sometimes, however, though the combs be situated in a diagonal manner or crosswise on one side of the hive, they will be parallel with the bars on the other; at least, in most cases, the ease of taking out the combs is greater on one side than the other, which must be left to the choice of the operator.

The comb to be taken being determined upon, the places on the sides to which it is particularly fixed must be noticed, and loosened by cutting them with the narrow knife, when by the finger and thumb of both hands, the bar is to be endeavoured to be lifted up with gentleness; if it does not move readily, it must necessarily be fastened in some other unseen place, or the different combs be joined together, which are to be made loose by directing the knife from one side of the hive to the other. A comb is on no account ever to be forced out, as it is certain to break, and produce much inconvenience and mischief. When the comb is fully separated in all its parts, it is easily lifted out; but the more gently and gradually, the better in all respects.

When the outside comb has been removed, the next is taken with more readiness, as the particular parts where it is fast can be more certainly seen: where in this comb there may chance to be brood, and the cells not full, the comb is to be replaced, until such time as it is supposed they have quitted it, and that the bees have rendered the cells full of honey.

The bar having been wholly removed, another should be put in its place; but where this is not at hand, the comb must be separated by the knife from the old one, and that restored to its former situation in the hive as soon as possible. The combs may then be taken out on the opposite side in the same manner, which done, replace the top, fasten it down by plaster, and let it remain for the future taking of the full quantity of the honey in the hives. The partial or wholly taking the honey is to be performed somewhat in the same manner; but in the latter case, which is usually in the beginning of the autumn, after the honey-collecting season is over, the hive is to be weighed, and what is above thirty-five pounds, with the hive and bees may be taken.

After the honey has been taken, what bees are found hanging to the combs of it are to be gently brushed off, as above, into the hive, or, in dry fine weather, on the ground, whence they will speedily find the means of getting into the hive.

As the bees of old stocks are constantly less

in size than those which are the produce of swarms, as arising from the young bee, in every case of its leaving a cell, having a small thin film of it left behind it, which, as it requires about three weeks in becoming full grown, the *queen* drops her eggs in the same cells four or five times in the season, by which each of the cells will be lessened in proportion to the number of such filmy coats left in it; so that the bees which are produced at the first part of the season, while the cells are the freest from such thin crusts, will, of course, be larger than those which are brought forth at the latter end of it. In the view of avoiding this inconvenience, in the *improved* hive the middle combs are constantly to be renewed every other year at the commencement of the season, previous to the *queen's* having begun to lay any eggs; but it may be noticed, that it is only needful to renew one of these combs every year, as were they to be all taken away, the destruction of the hive would be the consequence.

Second swarms or casts being here rarely worth preserving, an easy mode is afforded by *this* hive of hindering the swarms from coming forth, or if they come forth, of affording the stock-hives that increased room, which on their being restored, no impediment may be given to the labour of the bees by over-confined limits. In this intention, as soon as first swarms are gone forth, as the same or next day, open the hives in the above manner, and take out each of the side bars; taking particular care, as at this time there may be much brood in the combs, not to disturb such of them as are in this state, which is readily known from those filled with honey.

The manner of separating the honey from the combs, and rendering the wax in a proper state for use, will be considered and explained below.

SECTION V.—*Feeding and preserving Bees in the Winter Season when necessary, the Enemies to which they are the most exposed, and the Advantages of keeping such Stock, with the diseased States affecting them.*

THE feeding of bees in this season is beneficial and proper in several different points of view; it will prevent their loss, promote their forwardness in the spring, and preserve them in better health. Though it is the nature of these insects to be in a sort of torpid condition from the cold of the winter months, and consequently then to require little or no food for their support; yet as the state of the weather is so variable in this climate, they are occasionally revived and induced by the occurrence of mild, warm, sunny days, to revert to their former state, and require food. The high degree of cold in winter is here therefore favourable to bees, as when it is continued for some length of time, they are found, through the whole of it, to be linked closely together in clusters in the spaces between the combs, which, though perhaps not wholly deprived of motion, they stir not in such cold states, and of course consume no food. On this account, the least mild aspects are the most favourable for bees in the winter, and the stocks are in every respect as forward in the spring as when there was double the quantity of honey in the preceding autumn. The state of the stocks should, however, be well examined in the winter season, and if it be found that instead of being clustered, as above, the bees fall down in quantities on the bottoms or stools of the hives, the latter should be instantly removed to warmer situations, where the bees will soon recover themselves.

Such winters as are mild and open have therefore many disadvantages and injurious effects on bee stocks, which those of the more

cold and severe ones are free from, both in regard to the consumption of food and in other respects. It is constantly found that they do the best when the cold of the winter is uniform and somewhat long.

It is clear from these circumstances that, in spite of every thing that can be done, feeding bees in winter must often be proper and essentially useful in promoting the welfare and success of the stocks, in a much higher degree than is commonly supposed. The liquid material which is the most proper and useful for the purpose is probably that of soft brown coarse ungranulated sugar, dissolved in mild ale over the fire until it acquires the consistence of a syrup, the proportion of the former to the latter ingredient being about a pound to half a pint. It is to be given according to circumstances, either in thin narrow very shallow troughs, from six to eight inches in length, which are to be passed through the door-ways of the hives into the interior parts of them for the bees to feed more easily, or some may be set externally for them in a proper manner as necessary, which will soon be taken into the hives. A trough or other feeder, which holds about half an ounce of the syrup, will mostly be sufficient for the largest stock for twenty-four hours, and prevent their feeding too greedily, which they sometimes do when they have too much food given at a time, and thereby injure themselves and become diseased.

In the beginning of the autumn, by giving proper full supplies of sugared ale, many hives of the weaker kind may be saved that would otherwise perish, as by setting some plates full of it before them it will soon be taken away and conveyed into the empty cells to supply the place of honey in the winter season; and as this season advances, by having a little red port wine mixed with the sugary liquid, the danger of the bees purging may be avoided, and by it, with a suitable proportion of salt, be kept in perfect health. In cleaning away the filth and nastiness on the floors or other parts of hives, some salt should also be strewed over them in the same intention. In all cases after the swarms have been hived, when the weather is wet and bad, the occasional feeding of bees in the manner already suggested is necessary, the hives being placed as much out of the way of the common situations as possible.

ENEMIES OF BEE STOCKS.

These are of the insect as well as other kinds; such in the former as the hornet, wasp, moth, speckled butterfly, ant, earwig, and wood-louse; and in the latter, the mouse, birds of different sorts, as the robin, the willow-biter, the sparrow, the swallow, the duck, and the toad. The hornet destroys the bees, the wasp feeds on the honey, the moth is so injurious that if it once gets possession there is no saving a hive, the butterfly is extremely hurtful by laying its eggs there, and the earwig and wood-louse plunder hives greatly. The mouse is so destructive that a single one in a short time will ruin a whole hive. The birds are highly prejudicial, as picking up the bees as food and thereby reducing the stocks. The injury of the ant may be prevented by keeping the stem of the stand well freshly tarred. All these several sorts of pernicious vermin are therefore always to be well guarded against, which is often difficult and troublesome, but where it is not carefully attended to, there can be no security for the hives or stocks.

But besides these, bees are frequently themselves great enemies to each other's stocks, by the plundering them of the winter reserve of keep, which causes serious conflicts to take place between them, when they have not suffi-

cient stores for the season. In the cases of these attacks, many bees are seen lying dead underneath the hives, the contests being highly rancorous, destructive, and continued, when the stranger bees have once succeeded in getting an entrance into the hives. Such depredations may be much prevented by properly contracting the doors of the hives, so as to afford a more easy means of defence. As the stocks of weak hives are constantly the intruders and plunderers, it is best to have them taken, as being worth little and causing much trouble.

ADVANTAGES OF KEEPING BEES.

The benefits of keeping bees must necessarily be different according to circumstances; but it is to be considered in all cases of this sort of culture, that the whole of what is produced, from the different matters raised, is nearly a clear profit, there being neither charges on it in one way or another, nor any inconveniences proceeding from it whatever; while it requires but little trouble or capital, and the keep of the stock is almost without expense. These circumstances, with the great power of extending the bee husbandry in almost every situation, must render the advantages of it much greater and more an object than is commonly believed both to individuals and the nation in general. It may consequently be made, by attention and proper management in preventing the loss of swarms, to yield perhaps as much profit as some other articles of the small farm kind, which require more care and trouble. The quantity of honey and wax which is in common taken from hives of bees is generally from about fifteen to twenty-five pounds each of the former, and from one and a half to two of the latter. The price of honey is usually from 1*s.* 6*d.* to 2*s.* the pound, and that of wax from 10*l.* to 15*l.* or 16*l.* the *cwt.*

DISEASES AFFECTING BEES.

The bee is subject to but few states of this nature, and those arise chiefly either from wet, want of exercise, and the air being too much loaded with moisture and dampness in the less active seasons of its existence, or from the defect of proper feeding and keeping.

SCOUR OR PURGING.

This is very commonly considered as a sort of dysentery, to which it has, however, little or no relation whatever. In it the bees become very weak and exhausted, in consequence of the continual discharges that take place, and cluster together in a heap, so as to make each other dirty, and thereby the whole to become filthy and contaminated.

The appearances that shew the disease to be present are small particles of wax lying about the doors or floors of the hives, and many dead bees caked together with much filth and nastiness, which are sometimes mouldy, and not unfrequently cover moths or other insects.

In restoring the bees to health, the stocks are to be removed, as soon as such a state is rendered evident, into some more warm situation, cleaning away by the brush any foulness that may be on the edges of the combs, and cutting out the mouldy or black parts when present. Then let the hives be brought into more warmth, so as to gradually revive the feeble or torpid bees, and on their moving, to suffer them to have a few drops of sugared ale given them in mixture with a little red port and a very small portion of salt, tying them over loosely with a cloth that none of them may creep away, then suffering the hives to remain there for some hours longer, in order to become well aired and purified from all sorts of foulness. On the stocks becoming fully restored, they may be fed with the ale mixture as above, and

be set on clean stands until the following day, with the doors of the hives properly open. Should the bees then, however, appear few in the hives or weakly, the former must be put on dry warm bottoms or floors, and the stocks be placed on their usual stands, and be further fed as necessary.

DEBILITY OR WEAKNESS.

When bees are found not to fly out and appear as active as in other cases, it is a sign that they are either destroyed, torpid, or in a starving condition. In these states they sometimes drop down on the floors of the hives. They also occasionally, in the famished state, fly about the bee-grounds and other places with a tone that denotes the want of food. The door-ways of such stocks are in this state crowded with bees.

In the former of these cases they are best restored in the manner directed above, and in the latter by letting them have fresh dry warm floors and feeding them with the syrup without delay. These are the two principal states that affect bees in any great degree so as to cause the loss of stocks.

STINGS.

In case these happen, it is proper to have in readiness a mixture of pure olive oil and a little of the solution of subcarbonate of ammonia or spirit of hartshorn, as one ounce of the former and a drachm or two of the latter, to be put instantly upon the part in a small quantity, as necessary.

SECTION VI.—*Uses and Applications of the Products of Bees, and the Means of separating, preparing, and rendering them pure.*

THE uses and purposes to which the different products of bees are applied are numerous as well as important, and indispensable in many cases. Honey is frequently an useful and necessary ingredient in the forming of a great number of compositions of the medicine kind both for man and animals; and it enters into several different elegant forms of matters as food, besides being used more generally as an article of the more rare and nice diet kind in various domestic intentions and situations, where it is found suitable to the constitution and habits of those who make use of it. But it is to be regarded rather as an occasional elegant substance for consumption as food, than as being in any very general use for that purpose. In its constituent principles it contains a more concentrated and powerful acid than sugar, and there is more spirit afforded in its distillation from the same weight. The foreign honey of the southern and other insular states is more fine and liquid, and has more fragrance in the smell than that of this country, which is usually more solid and pure, though liable to become granulated and lumpy.

In regard to the wax of bees, it is an article of much more use and necessity, and of course more valuable, and applicable to a great many more uses and purposes in the arts, manufactures, and other ways, than honey. It may be provided in the best manner where the bee stocks and hives are preserved in the most clean, fresh, and healthy states; as whatever may be the process of the bee in forming the wax from the materials by which it is afforded, it must be effected in the state while the matters are pure and uncontaminated in any way to have the finest wax.

PROCESS IN SEPARATING THE HONEY FROM THE COMBS.

In order to effect this in the safest and best manner, the combs are to be carefully taken and placed where there may be the most security from the trouble and molestation of any

bees, and the least danger of injury in their taking away honey, when, if any bees are discovered, they are to be removed by being brushed from the combs, so as to be restored to the hives; and where there are any young bees in the combs, as may sometimes be the case, the parts in which they are must be laid aside, as they would injure the taste of the honey. The bee bread is also to be taken away, and both these matters used in preparing the wax. Previous to the combs being placed in the draining position, they should likewise be carefully cleaned from every sort of filth, and have the crust with which the honey in them is covered then pared off by means of a thin, broad, sharp knife, the combs themselves being divided through the middle so as to lay the cells open at both ends, and let the honey be freely and fully discharged from them. A suitable frame or bridge is then to be laid over a large earthen pan or other proper vessel, on which a sieve, or other such contrivance, that will let the honey freely pass through it, is placed, into which the combs in the above state are to be put, so that the honey may run and be drained out in quite a clear state, that which is thus procured being kept separate, as being the purest and most valuable. The situation which is the best and most favourable in the above intention is that which is rendered properly warm by a charcoal or coke fire, as being the most free from smoke, which is injurious to honey.

An inferior and less pure honey is sometimes procured by the heating, breaking down, and squeezing of these drained combs, and those which are little filled; but as the honey, in these cases, becomes so much blended with the wax, which is the most valuable, there is much loss sustained, notwithstanding a large portion of it may rise and be taken from the surface.

In these ways a fine and more coarse sort of honey may be usefully and profitably provided from the same combs.

CLARIFYING AND KEEPING HONEY.

For the purpose of rendering honey fine and clear, the pan or other vessel in which it is contained should be set in hot water over a charcoal or coke fire so as to boil very gently, the scum being taken off as it arises until no more comes up, when the honey is to be put into a dry jar, closed tightly, and placed in a dry situation.

In order to keep honey in the store state, the jars or pans in which it is put should be bunged up and covered in a very close manner, and be kept in a perfectly dry place, as from its quality of taking up the moisture of the atmosphere, it is otherwise liable to become greatly injured, and at length take on a state of acidity. The weight of honey is sometimes increased by having flour and other such matters mixed with it, and thereby becomes less valuable and less proper for keeping.

The whole of the processes in separating the honey and preparing the wax are the best to be intrusted to experienced persons where they are on any large scale. When the stocks of bees are considerable, much house room will be wanted, with proper sets of horse-hair and linen cloths, earthen vessels, buckets, and other proper utensils for the purpose, there being great cleanliness used in every way. The weather the most suitable for the business is when it is dry, warm, and sunny. In common, clear white honey is to be preferred to the darker coloured, the more new to the old, and that which is produced in the spring to the summer and autumnal sorts. It is usual here for one hundred weight of honey-comb to afford not more than from three or four to five or six pounds of wax; but in some other countries,

the produce of it is nearly double to that from the same weight of comb.

PROCESSES IN EXTRACTING AND PREPARING THE WAX.

The fine-drained combs in providing the best wax are to be boiled by themselves, with just sufficient water to keep them in the floating state, being well stirred until they are wholly melted. The fluid of the reduced combs is then to be poured into a strong three-cornered linen bag that tapers to a long point, which is fixed or held for the purpose over a large tub or other vessel full of cold water, when the top part of it is to be directly drawn tight by a string in it, two persons squeezing the bag in a downward continued manner by means of two strong flat smooth stakes which are firmly tied together at one end, between which it has been placed for the purpose, until no more liquid wax passes. The wax, on becoming cold, is to be taken from off the water in the vessel, and re-melted with only just sufficient water to prevent its being burnt. While it is boiling, it must be well stirred, and the scum is constantly to be taken off as it rises; after which, it is to be poured into proper vessels which have narrow bottoms and wide tops, they being previously rinsed with cold water, as well as all the tools made use of in the business. The moulds or vessels which have thus received the wax are to be placed with a cloth over them, so as that they may have the benefit of the fire, and cool in a gradual manner without cracking. Fine wax may be more readily extracted in the same manner by using less water, so as that it may just avoid burning and having the colour spoiled.

When the wax has become perfectly cold, the cakes are to be turned out of the moulds or vessels in which they were put, any dregs that may appear on their bottoms or tops being pared away, so that they may be clear and in a saleable state. Such parings may be melted over again and afford a little more wax. The vessel used in boiling and melting wax should constantly be much larger than necessary for holding the materials of it; as on boiling they often suddenly rise very high, and may without such precaution become dangerous in the effects they produce.

It is well ascertained that the larger the cakes of wax are the better they keep, bringing higher prices in the market: and it is also found that the more gentle the boiling has been the better the material, as too rapid boiling renders it hard, with an increase in the difficulty of bleaching it.

The combs should not be kept too long in the unmelted state, as they moulder and rot, and are liable to breed the wax moth, which is very destructive and troublesome.

MEAD.

This is a liquor prepared from the less valuable parts of honey by boiling it over a rather slow fire, in the proportion of about one part of it to three of water, until one-third of the whole is dissipated. After which, the liquor is to be skimmed well and put into the cask, care being had that it be preserved quite full in the time of working, being kept in a warm situation and wholly unstopped till that ceases; when the cask is to be bunged up, and after some time becomes in the fit state for use. Thus a vinous liquor is produced, which may, however, be rendered more strong and agreeable by mixing and adding cut raisins, boiled in the quantity of one pound to three of the honey, a crust of bread toasted, a little subcarbonate

of potass, and a glass of brandy, to the liquor at the time of casking it.

The ordinary drink of this kind is, however, merely a mixture of the refuse honey and water without undergoing any fermentative process. These liquids have sometimes the name of *metheglin* given them.

Chapter XIV.—LIVE STOCK.

FISH.

Section I.—*Nature of the Culture of Fish, in different Circumstances; Kinds most proper and beneficial for Ponds and Rivers in different Cases; Properties, and Characters of the Sorts most suitable for each; and the best Manner of forming Ponds and Waters for such Use.*

Fish have hitherto been so little regarded, that they can scarcely be properly considered as farming stock; they are, however, as much entitled to it as many of the other small kinds of animals which furnish the farm in the best and most full manner.

CULTURE.

In the cultivation of fish for domestic use, and the profits which they afford in their sale, several points of material importance are to be well considered; such as the sorts and means of it which are the most suitable, proper, and advantageous in different instances; and the nature and situations of the lands and waters where it can be performed with the greatest propriety and to the most success and benefit. There are unquestionably a vast number of neglected spots of different extents in various parts of the kingdom, which, from the impossibility of their being turned to any other use or account, in consequence of the expense which would attend them; which, where water is readily procurable, are capable of raising a far larger proportion of human subsistence as food, than the most improved portions of land of the same extent, applied to any other purpose whatever; as by suitable care and attention in their culture, fish, in such cases, speedily become abundant and of great value to individuals as well as the public in general.

But though the culture of fish in some slight degree almost every where prevails, it is but in a very few of the more southern districts that the practice of breeding and raising them for profit is had recourse to and carried on in a regular manner. It is probable, however, that when the culture and means of raising and managing such sorts of stock in all their several kinds become fully known and familiar, they will be found, in a multiplicity of cases, to yield much advantage in family use and convenience, as well as profit in the sale, where nothing would otherwise be produced. Consequently, in all cases, the proprietors and occupiers of land should be careful to see that no loss is sustained by them or the community in this way, by the neglect of spots where they can be raised to advantage.

Notwithstanding it has long been supposed by some persons that there are particular waters which are improper for raising fish, more full experience has decided that there are few which may not be used with benefit in this

intention for some of the sorts; and that, where there has been any kind of failure, it has originated from faults and hinderances in other ways, as in the destruction of their roe or spawn and young fry by voracious water fowls, birds, and other carnivorous aquatic animals, which should of course be always kept from such waters, but especially in the breeding seasons of the fish which they contain.

The nature of the means which are necessary to be made use of in producing and bringing fish to perfection must be various, according to the differences in their economy and habits; on which too, must depend the manner of first stocking the waters in which they are to be kept, as well as the modes of feeding, rearing, and perfecting them afterwards; all of which will be fully pointed out under their proper heads below.

PROPER KINDS OF FISH FOR PONDS.

The kinds of these sorts of stock which are the most suitable and proper where the waters are of the pond kind, and large, clear, and rich in quality, are probably *carp*. The *tench* may also sometimes be proper in such cases, either alone or in combination with the former sort; but they are more proper where the waters have greater thickness and are more disposed to be muddy. As to *eels*, they are disposed to succeed the most perfectly in waters which are rather still and sluggish, with thick slimy mud bottoms, supplied by springs, and where they are not too large or deep, but connected with the sea. In the case of *pike*, they are most proper for waters which are rather large, and of either the pond or river sort, succeeding best where there is a constant and full supply of young unnecessary fry and spawn, and no other sort of fish to be kept with them.

PROPER FISH FOR RIVERS.

The *salmon* is a fine fish for rivers or streams which empty themselves into the sea, where the waters are suitably clear, and they run sufficiently into large shallow banks for the females depositing their roe or spawn to advantage. *Perch* succeed well in river waters of almost any kind, but most perfectly where they are rather inclined to be soft and have a muddy bottom, and may be useful in ponds in many cases. The *trout* is also a good useful fish in the same sort of rivers and streams as the first; and the *flounder* is proper and suited to almost all rivers and large streams connected in the same way in discharging their waters.

There are a few other kinds of fish which are capable of being used in these ways, but they are much less esteemed and beneficial for the purpose, though they may occasionally be found of benefit in particular cases. They are chiefly the *roach* and the *gudgeon;* the former of which seems to prefer deep still rivers which have sandy or marly bottoms under them. They are frequently met with in the warm seasons near the terminations of fords or mouths of rivulets and shallow places, being concealed in the weedy matters below shady substances of different kinds. The latter is fond of river waters which are not too deep and where there is a gravelly bottom, with plenty of fresh food continually supplied. They both multiply fast, but especially the latter, in the beginning of the spring, and become good as food in the latter end of the year and early in the beginning of the succeeding one.

The whole of these several kinds of fishes belong to the different divisions of the *spinous* sort, and have many distinguishing circumstances, properties, and qualities, which strongly point out their nature, habits, and manner of

FISH.

POND.

Fig. 1.

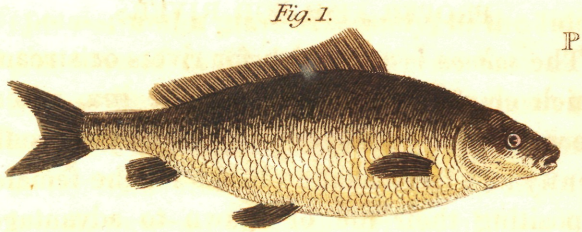


Fig. 3.



Fig. 2.



Fig. 4.



RIVER.

Fig. 5.



Fig. 7.

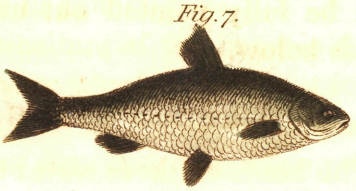


Fig. 8.

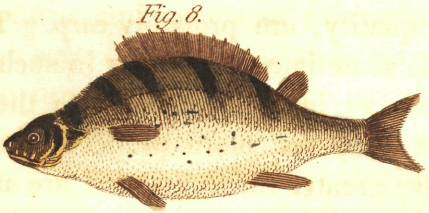


Fig. 6.

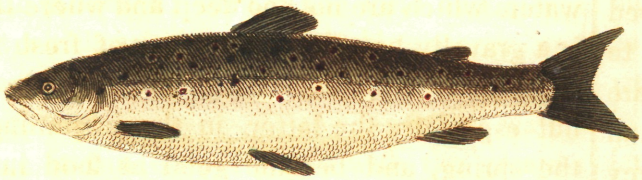


Fig. 9.

Fig. 11.

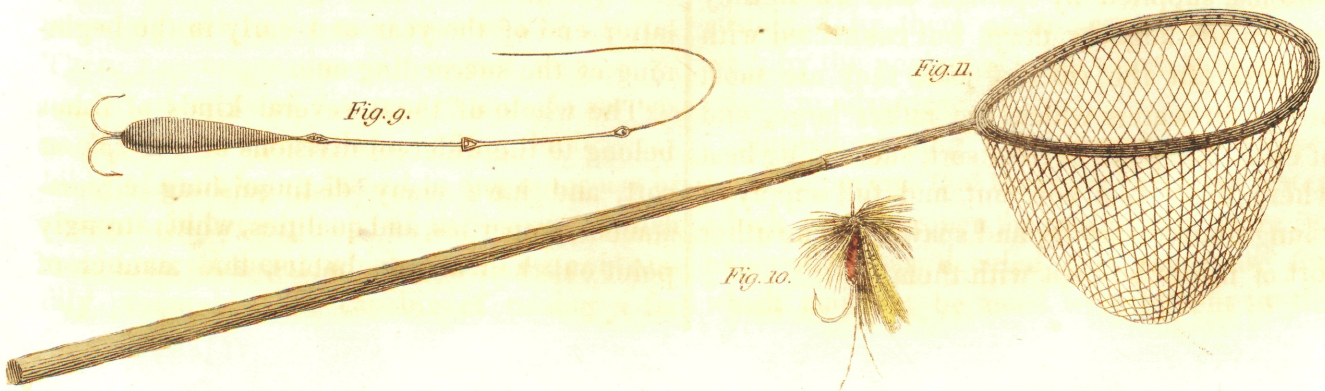


Fig. 10.



London, Published by Thos. Kelly, 17, Paternoster Row, Jan.1.1824.

living, which are greatly useful in raising and managing them in all cases.

In the first, or CARP kind there is some variety in the nature of their growth, but that sort which becomes large, full, and well-grown, from the head to the tail, is the best to be raised in the intention of profit and advantage in the pond system. They have the property and habits of being much aided and improved in their raising by the shade of banks and trees, with marshy bottoms of the waters, and sufficient shallow beds, well set with weeds of the water-flag and other kinds. They are an extremely prolific sort of fish, as the roe or spawn in them, in some cases, has been found to be more in weight than the whole of the other parts. When taken, they are but in few cases without either having roe or sperm in them, as they may be females or males, from which they would seem to spawn more than once in the course of the year, but the chief period for the purpose is in the latter end of the spring, whence they are in the highest perfection as human food in the preceding periods for some time before that. This is a sort of fish which is very long-lived, and capable of rising to a large increase in weight in many cases, The form of this fish is seen at fig. 1, in the subjoined *plate*.

In the EEL kind there is a considerable diversity in the shade of colour which they possess, as from that of a rather sooty black cast to a more light green of the olive hue, which last, when they have the title of *silver* eels applied to them, have the belly parts wholly white, and are every where clear and fine in their skin. In some cases eels have a peculiar form of the head, it being large, with the upper jaw extending much over the under one. In the blacker sort it is also large, with a black back and yellow-coloured belly part. The common dark-coloured eels are the best for ponds, and the more light casted ones for rivers. The eel is capable of rising to a great size and weight, in many cases, as to fifteen pounds or more, and is much favoured in its growth by having the means of roots, stumps of trees, rocky clefts, holes and stones, with weeds and muddy oozy bottoms to lay under and upon. It is very mischievous and destructive to the roe or spawn of fish, and the small fry which they produce, and also devours and destroys young ducks, and broods of other kinds, when suffered, while too young, to be on the ponds where they are. The produce of the eel are brought forth at or about the latter end of the spring season, when the weather begins to get warm. The form of the common eel is seen at fig. 2 in the *plate*.

The TENCH is a pond fish, which is much worthy of being raised, as being fine in the flavour of its flesh, and rising quickly in its growth, though not large. They are a sort of fish which seem to require weedy or some other kinds of shelter in the waters where they are to be raised, in order to succeed in the best manner, as their habits are for still water, in situations where they can lie under such sorts of shade. They commonly begin to spawn about the month of June, which is continued for some time, in some cases. They seldom exceed five pounds in weight, the more general weights of them being from two to three. The form of the tench is given at fig. 3 in the *plate*.

The PIKE is a fish which delights in still, shady, undisturbed waters, where it grows to most size and weight. In the warmer seasons they have the habit of sheltering themselves underneath the leaves of various kinds of water plants; but in the colder periods of the year they keep in the deep waters, where there are overhanging banks, trees, and other matters for

their protection. They drop their roe or spawn as the weather becomes fine and warm, in the spring months, on the grass and weeds in the shallow parts of ponds, where it is often much devoured and carried to other waters by different water and other fowls and birds. These fish rise speedily to much weight, but the destruction and consumption of other sorts of fry, as well as that of their own, and other kinds of animal matters, are so very considerable, that they can seldom be raised to much benefit. The pike is said to live to a very great age. Its form is given at fig. 4 in the *plate*.

The common SALMON is a fine river fish, which forms many important fisheries in different parts of the country, and which may probably be found very beneficial in some smaller rivers in other places, which have a communication with the sea, but which are not yet stocked with it. It has the peculiar habits of being bred, and having its early growth considerably up in the shallow parts of rivers, from which it soon returns to the sea; when, at a certain period of the same year, it again constantly returns into such fresh-water situations, and, what is singular, so far as the circumstance has been capable of being traced, the same shoals of these fish invariably return into the same rivers from which they had departed, and not into other different ones. It is a fish which has the property of growing rapidly while in the young state, so as to attain a large size, and of affording a red-coloured flesh of an excellent quality and fine flavour. The young salmon are produced from the deposited roe or spawn of the old fish, which is dropped in the latter part of the year, and brought forth as the weather gets to be rather fine and warm, in or towards the beginning of the spring season, being usually laid and impregnated in shallow holes and places covered slightly by the fish.

In case it should be found correct, that the same salmon which are raised in any particular river have the instinctive power of returning again to the same from the sea, where they have gone for food, and to suit their peculiar nature and economy; the best and most certain means of increasing and bettering the produce in any river, would probably be, those of allowing plenty of the full-grown of them to have their free liberty in passing up the rivers to the *spawning* shallows and places; the *protecting* and *securing* them while there, in the best possible manner; and the *guarding* and *preserving* the infant produce of them as much as possible in their passage to the sea, as the waste and loss in this case is often extremely great and highly injurious. The form of the salmon is given at fig. 5 in the *plate*.

The TROUT is a river fish, which differs much in the nature of the growth of it, as to size, form, and colour, in the different streams and waters where it is found; but the best sort are those which have the most regular grown state from the head to the tail, and in which the flesh somewhat inclines to a yellowish cast when prepared for the table. In the female, the head is of less size, and the body part of more depth than in the male, and the flesh is supposed to be superior in the flavour. Some small streams have trout in them which breed well, but never rise to much size. The appearance of the trout, and the spots upon its body, differ considerably in different rivers and waters, and at distant periods of particular seasons. These fish are supposed to be at their full growth about the fifth year of their age, when they have various dimensions, as from seven or eight inches up to thirty. They may live about eight or ten years.

In the trout, the principal time of spawning is in November, though sometimes it is begun

in the preceding month. About the end of the hot summer season, they quit the deep waters where they had laid for some time before, and pass up to the shallow parts of rivulets and streams, in search of proper situations for depositing their spawn in; which are constantly where the bottom is gravelly or somewhat of that nature. They are extremely prolific, and their spawn is most eagerly looked for and destroyed by birds and other fish. The form of the trout is shown at fig. 6 in the *plate*.

The PERCH is a fish of both the river and pond kind, which rarely attains any great size, being of but slow growth. In cases where these fish rise rather large, their usual length is found to be from ten or twelve to fifteen or sixteen inches in extent. In some waters where the quantity of small fry is large, these fish will sometimes increase rather rapidly, and become of much more weight. These are a sort of fish which are met with in clear rivers, with gravelly bottoms, which are somewhat swift, as well as in those where they are sandy and clayey in their foundations, and more slow. They require the water to be rather deep, and keep in holes near to or on the sides of streams where there is a sort of eddy, and under banks and other such places. They have the property of thriving much in still waters, which are fed by small brooks and streamlets.

These fish drop their spawn in the spring months, in large quantities, in some shallow places proper for the purpose. They live much upon the small fry of other fishes, and are themselves preyed upon both by the pike and the eel. They are extremely tenacious of life when out of the water. The form of the perch is seen at fig. 7 in the *plate*.

The FLOUNDER is an useful fish, which is met with in most shallow parts of the sea, and which is commonly found at great distances from it, in almost all the rivers that have a free communication with it; in which last case, when not taken, they continue to produce in very great quantities, rising to a good size, and to have an excellent flavour in the flesh. This fish may, therefore, in many cases of these rivers, be attended to with much advantage and profit.

They are a sort of fish, also, which are capable of living in ponds, and of becoming large and fine in them, but they will only last a few years in such restricted situations.

They deposit their spawn in May and the succeeding month, and are in season for the remainder of the whole year, which makes them a very beneficial fish. They have the property of living long out of the water. The form of this fish is seen at fig. 8 in the *plate*.

PROPER PONDS AND WATERS FOR FISH.

In providing these conveniences for the purpose of raising and preserving fish, many points and circumstances are necessary and important to be well attended to and particularly considered, as well in regard to the nature and situation of the grounds where they are to be formed, as to several other matters which are not less material and useful in such cases. Where there are suitable places for them in the hedge-rows, or other such situations, and they are not required to be of any great size, they may be very conveniently made in them, so as to combine the utility of keeping fish and of drinking ponds for the cattle stock of different pasture fields. In many cases it may only be necessary to form them for the mere retention of the fish till the time of their becoming of proper growth for the market. In some instances it may, however, be profitable, as well as convenient, to have them formed for the purpose of breeding and raising the fish in, as well as

for keeping and preserving them in until they have reached a sufficient growth for use or sale. In proper valley depressions, where there are rivers and waters suited to the purpose, they may frequently be provided at but little expense or trouble in any way, as where several are constructed on the same line, the head of one may become the bottom of that immediately above it. The nature, forms, and extents of all such ponds must, however, be regulated by the particular habits of the fish, the peculiarity of the situations of the lands, and the nature of the supplies of water which can be had for the purpose, as by such means the most benefit will arise to the fish in depositing their spawn, in their early growth and health, and in many other ways.

In all cases where cross banks, heads, and sluices, are necessary for keeping the waters properly up, they form the main expenses and difficulty of the work in preparing such ponds. Where the nature of the soil is loamy or clayey, it may, however, be performed without much difficulty or cost in the manner earth works are commonly executed; which is by having the foundations of them laid to sufficient depths, and the earthy substances then well laid to them in the puddling and ramming manner. The height and strength of such head parts are to be regulated by the nature of the situations, and the quantity of water which is to be kept up, the slopes towards the waters being always made the largest. There are, also, in some cases, to be diverting channels or passages, for letting on or taking away the superabundant water in time of floods; which may be formed along the sides, so as that the ponds may be kept full by the one, and emptied by the other. The sluices, in these cases, should first be laid in the lowest parts, being made of properly seasoned oak, with sufficient trunks, suitable for carrying the water through under the heads of the banks or into the side passages, the whole being well rammed in by proper earthy matters. In every case where ponds of this sort are formed, the heads should be put at the lowest parts of the lands, in order that the trenches of the flood-gates or sluices, by having proper falls, may not be too slow in discharging themselves. Whatever the height of the heads or banks in such ponds may be, they should always have, for every foot in their rise, from a foot to a foot and a half in the slope, in consequence of the weight of water, so that a bank which has ten feet in height, should have not less than thirty feet in the foundation part, with three feet or more in breadth in the top, being raised so at first as when settled it may be about eighteen inches higher than where the water is intended to stand. In preparing for laying the foundations in such cases, it is the best and most secure method, to take out a couple of spits deep of the earth at bottom, all the way across, to the breadth of three feet, filling the space well in with good strong rammed clay; as if the bottoms be laid on loose miry earth, they are very apt to become undermined by the water geting in, and, in time, to have the heads weakened or wholly destroyed: the same width of well-wrought clay should be continued from the above bed of it to the very top of the banks, and when the whole is finished, the head or bank parts should be well turfed over, trodden, and rolled down, so that they may be well grassed before the water is admitted.

The forms of ponds of this kind may be various, as the nature of the circumstances may be, but they seldom need to be of much depth. If they be about six feet deep in the middle parts, becoming gradually of less depth to the different side parts, it will mostly be sufficient

for the fish to indulge themselves in, and to give them the means of properly depositing their spawn. It is always of benefit, where it can be the case, to have a small stream passing through such ponds, as the fish grow faster and are better flavoured in their flesh. Such streams or larger springs, however small the currents they occasion, provided they pass freely through the ponds, have also other beneficial effects, as they are not only essential in aiding the feeding, improving, and advantaging of the fish in the summer heats, but they prevent the effects of severe frosts in the winter months, which, unless there be a current of water, which in all cases is combined with air, there must often be the most destructive consequences to the fish in ponds. In most sorts of fish, with the exception of the tench, there are but slight differences in the injuries which are produced in this way, as they all suffer in nearly the same manner; but such currents of air and water soon restore them, as they are rarely known to be injured by frost, in such cases, while the waters have such depths as not to be frozen to the very bottoms of them. Where there are sluices, the merely stirring the plugs will sometimes give the necessary current of air and water which is capable of restoring the fish. The merely breaking holes in the ice, in such cases, and placing different substances in them, by the removal of which they may be kept open, is far from answering the purpose, though often tried; the only safe means for preserving the fish in such states is, that of speedily removing them when once they shew themselves underneath the ice, as they are always in the habit of lying deep in cold times, and not disposed to move higher into the current waters, unless forced by the want of air.

Whenever ponds have been closed for some time by means of frosts, if there be any fear of the fish, holes should be formed in the middle parts and at the sides of them, in order to ascertain their real situation, as when they are not in the proper state, they will soon show themselves at such places; when there is nothing else to be done but that of taking the whole out as they come to the broken places, and preserving them in some proper manner; as where other suitable waters are not convenient, by putting them into large vessels filled with fresh water, in some warm proper situation, until they become quite restored, in which, by having the water frequently changed and refreshed in a partial manner, they may be safely preserved until they can be removed into proper situations. Where fish are but slightly frozen, they may sometimes be restored by being gently thawed.

In cases where large pieces of water are to be secured, it should be carefully seen, that the banks are made perfectly safe and strong, and that they be well protected from the injurious effects of heavy floods, which may be done in various ways.

Section II.—*Manner of Breeding and Producing the Young in Fishes of these different Kinds.*

In the manner of breeding and producing the young of fish, there are many differences, according to their nature and particular habits; but it is very usually performed in the oviparous, roe, or spawn-depositing method; and in some cases, in that of the viviparous, or living manner of bringing the young forth. In the former of these modes, the female deposits her roe or spawn in some proper place, as her habits may direct, for its being fully and conveniently impregnated by the male. Almost all the above sorts of fish, and many other kinds, produce

their young in the first of these ways. The processes of effecting which, in such cases, are differently performed, and completed in different instances, as well from the differences in the nature and habits of the fish themselves, as from the season of the year at which the spawn may be deposited.

In all those sorts of them which deposit their spawn in the more shallow and still waters, in the spring and summer months, such as the carp, perch, pike, and many others, it would appear to be the general habit and disposition to drop their spawny matters on the leaves and vegetable productions which float near the surface of the waters, which are undoubtedly the most favourable and proper situations for the young being brought into life, and promoted in their infant growth. But in those which throw out their spawn at other seasons, such as the salmon, the trout, and several others, situations and places about the mouths and sources of rivers and streams, and the more brisk fresh-water currents, are commonly looked for and taken possession of by the fish for this purpose, there being there a continued flow of fresh water, without any sort of stagnation ever taking place; and, in consequence, the water is always the most fully and completely saturated and loaded with fresh air, either in its natural current state, or while it is falling in the manner of rain, being the most proper and beneficial in such use in this condition. There must also be the necessary and proper state of warmth, in all such cases, in order to produce the most ready and best effects in breeding and raising the young of all such fish.

In other cases, too, the fish most likely cast and deposit their oviparous spawny substances in such places and spots as are the best and most adapted to their particular nature and habits of life, and where there is the most favourable states of heat for the purpose; as also where the waters are the most perfectly impregnated and filled with fresh air, as it is well decided, that the impregnated oviparous spawny produce of them does not afford young fish, any more than the seeds of plants begin to grow, unless where they are fully, constantly, and perfectly provided with fresh air. The young fish, in the state of ova, roe, or spawn, therefore, procure the oxygen or vivifying principle, from the common air which is mixed and incorporated in the water which encloses or passes over it, which, in the case which has been first noticed above, is greatly imparted to the water by the leaves of the vegetables on which it is dropped, in the state of performing their natural healthy functions and offices; which, too, most probably, give a more proper and advantageous situation for the male fishes impregnating it upon, than would be the case in any other circumstances. And in the latter cases, which have been just stated, it is derived from the continued flowings of the fresh and completely aerated waters over it, as soon as it has been fully and effectually impregnated in the shallow waters, currents, and streams. It is believed, also, by some persons, that in these cases, it is this instinctive influence of leading the fishes to procure a proper full supply of air for giving life to their oviparous spawny material where it is to be deposited, that forces and takes them from the seas, and other such places, to the high country streams and shallow rivers, and which impels and drives them forward against the streams and currents, and makes them to use every effort in throwing themselves over various obstructions in their passages, such as wiers, dams, and other impeding erections of different kinds.

In the Eel, though of the same spinous sort,

and such fish as have no roe or spawn, the young are brought forth alive, or in a viviparous manner, and the most fit situations for the purpose are, most probably, on the sides of the banks of little streams or rivulets, at no great distance from the sea; but they breed well under the banks of ponds, and many other such situations. Where they can run down the fresh-water streams to the sea for this purpose, it is usually done towards the latter end of the summer, and when the brooks or little streams are in flood from the fall of rain; when, on their having gained it, and the young are produced, they and the young small produce return up the streamlets, as it may be convenient, in the course of the latter winter and spring months, in vast numbers, getting over any obstructions which may be in their way, by means of the adhesive slimy substance which covers the surface of their bodies. The breeding, in these situations, is most probably the best, most conveniently, and perfectly performed, for the eel. The young are brought forth in small coiled-up sorts of balls, they being not larger than small needles when first produced, but they soon increase in growth and strength.

In those fishes which produce their young by roe or granulated spawn, in such large quantities, there may be some differences in the lengths of time, and the manner of the young being formed and produced, as the nature, size, and kinds of the fish may be, but they all deposit such matters in places where both the sun and fresh air can freely act upon them in some degree, as has been already seen; though, in many cases, no high state of warmth or aeration may be necessary for bringing them into the state of life and existence.

There is much difference in the nature of waters for breeding and raising of fish, and some are more suited for some sorts than others. Where the bottoms are sandy, marley, or gravelly, but particularly the former, they are the best suited for breeding; and where the bottoms are rich in their qualities, and the waters fine and richly impregnated with different matters, such as the washings of uplands, streets, and sewers, they are the most proper for raising and completing them in their growth. In all cases where the waters are soft, and the situations of them exposed to the influence of the sun, they are favourable in these different intentions. All fish, of whatever kind, which are to be used as breeding-stock, should be healthy, of the largest, finest, and best-grown sorts, as they afford the largest and most perfect growing progeny.

The growth of fish is such, in most cases, as to require some years to bring them to any large size or weight, as from five to six or more years, from the time of their being bred; much, however, depends upon the nature of the waters in which they are kept. There are some sorts which increase much more rapidly in their growth than others, as has been seen above, which ought to be well attended to in the breeding and raising of fish for profit. The means of oyster raising is given below.

Section III.—*Proper Methods of Stocking Ponds and Waters, in different Cases and Circumstances.*

In performing this sort of business much attention is required to many different circumstances, such as the nature and size of the waters, the kinds of fish stock which are to be employed, the states of growth in which they are to be used, the seasons at which they are to be put in, and the means by which they are to be conveyed to the places where made use of for such purposes. Where the waters of ponds are good

and they are of large extent, more fish stock are capable of being put in on the same space than when they are smaller and more confined; a less proportion of fish stock is requisite where they are of the more prolific sorts than in the contrary circumstances; the same is the case, too, when the growth of them is considerable than when they are only small when put in; and when they are used in such intentions in the spring season, fewer will mostly be necessary than when the autumnal months are chosen for the purpose. In what regards the taking and conveying of the fish stock to the situations and places where they are to be made use of in this way, much care is necessary that they be handled and bruised in the least possible manner, and taken out of the breeding ponds in the most clean state from any muddy matters of which they are capable, by using proper sorts of nets and baskets in a careful manner. In cases where the distance to which they are to be removed is considerable, it is the best and most safely done in the late autumnal or winter months; but in case necessity obliges their removal in the warm summer months, it can only be effected with any chance of safety in the night time. The more expeditiously the fish in all these cases are got into the contrivances for carrying them, after they have been lifted from the breeding-ponds, the better they will succeed in their removals. The carp and tench kinds are probably capable of being carried with the most security and success on clean dry straw of the wheaten kind, being placed in a flat manner upon it at the bottom of the conveyance; but when large, fish will not bear to be laid in layers one over the other for a sufficient length of time to be so removed; it is better and less dangerous to make more journeys in all such cases. In removing small stock, fish-tubs, barrels, or water carts may serve the purpose very well and safely; but large fish must of necessity be liable to suffer great injury by being dashed and bruised against the sides of such vessels and conveyances, or by striking each other, which may often destroy many of them. The vessels in the progress of the journeys in these cases are to have fresh pure water occasionally put into them; and when the small fish are to be taken out, proper nets are to be held under the aperture where they and the water are to pass through, so that, when a small quantity have been let out, they may be put into the waters for which they are intended, without injury being sustained by the pressure of too many at once being given.

In stocking ponds it is material to have the fish in readiness whenever they may be wanted, and also to have successional supplies coming up to restore the stocks as they become lessened by sale or otherwise. But such points and regulations in this sort of management can never be properly successful unless by great care, order, and attention in conducting the practices in the raising and providing of fish as human food.

The most interesting sorts of fish in this intention, though the others in some cases may be found very beneficial, are carp, tench, perch, and eels. The two first may often, especially in large ponds and waters, be advantageously combined; but in such as are small they are always better to be kept in separate ones. In lightly-stocked waters, perch and eels are constantly to be avoided from being put in together, as being both greatly destructive of the fry of fish. Carp and tench mostly do well together when the ponds or waters are large in size; but in the contrary circumstances, the former, from having so much more power, prevents the latter from getting its food in a proper

manner. In small ponds it is seldom that carp produce much benefit, while in those of most sizes, tench are found to succeed well and afford advantage. Carp and eels, as well as tench and the same, mostly answer in rather a beneficial manner when put in together. Pike in no case should ever be suffered in ponds with carp or tench, but in such of the breeding kind as have small fry in large quantities, which are not necessary for use as stock.

In such waters as are rich and clear in their appearance, carp is the most suitable sort of fish; but such as are more thick with depositions of muddy substances are to be preferred for tench, and perch may be raised with benefit in those of most kinds. Eels succeed the most favourably where the waters have springs running into them, are connected with the sea, and have large rich muddy depositions at their bottoms.

Great care should be taken that in no cases ponds or waters be stocked too plentifully, and that they have never either pike or any other greatly-devouring sorts of fish put into those which are the uppermost ones, as by such practices the spawny matter may get through the gratings, and the lower ponds be unsuspectingly filled with them; as the pike in such cases will devour the whole of the fry of the carp and tench, and the two last consume wholly the food which should be the sustenance and support of the parents as well as their young produce.

It is proper that ponds should have favourably soft water, and be warm and open in their exposures, being carefully cleared of every kind of voracious destructive fishes and other reptiles, such of the former as the perch, the pike, the eel, and the trout; and of the latter sort, the water-beetle, the frog, and the newt or lizard, before they are stocked. All sorts of water fowls and birds should likewise be kept from them with the utmost care.

In raising carp it is frequently the practice to have ponds for spawning, breeding, and holding the young infant fish for a short time in the same summer in; for the raising and nursing the young fry in from the following early part of the spring, into which they should be put when the weather is fine and rather sunny; and after the space of about two years, or when they are become of the length of from four to six inches, a third or principal pond for containing the growing fish of some considerable length in.

In stocking these different sorts of ponds it has been stated as the practice in a good fish-raising district of this kind, that for each acre of the first sort of such ponds there should be about four male carp, and about eight female fishes of the same sort. Those which are the most proper for the purpose being from five to seven years old, and perfectly healthy, in full scale, with fine full eyes, long in the body, and free from wound or blemish. For the second, or nursing sort, for the acre, a thousand or twelve hundred may not be more than are necessary and proper. And for the last, or main pond, it is proper to have one given for every square of fifteen feet or thereabouts, but it is in all cases material that they have full room and plenty of proper food. The proper periods for stocking, in these cases, are the spring and autumnal months. Where such ponds or waters are very extensive, as three or four acres or more, the stocking may be in the proportion of three hundred to the acre; but where they are less in size, the proportion for the same extent must be lessened.

In re-stocking the same ponds after some years as may be necessary, four hundred to the acre may be the proper amount of the stock.

In stocking with tench, where the ponds or waters are suitable for them, in the first per-

forming the business, the proportion must be more than in the above case; and in the re-stocking, very considerably more, as in the proportion of that of from seven to eight hundred to the acre.

In stocking with perch, as they are a sort of fish which breed rapidly at the first putting in, six hundred to the acre may be fully sufficient for the purpose.

In some tolerable fish-raising districts it is the custom to stock with carp and tench in the proportion of not more than one hundred to the acre, they continuing in the ponds about four years. In the practice of an attentive fish-breeder and rearer in one of the first districts in the country for the purpose, in a pond of nearly sixteen acres, it is a rule to stock in the proportion of twelve hundred carp and tench, or that of seventy-five brace to the acre, in which they are found to succeed extremely well. Where there are no sort of destructive fish, however, too large a proportion of stock should be carefully avoided, as a plentiful supply of food is an important consideration where these sorts of fish are the stock.

Fish-ponds may have the waters of them drawn off every three or four years, as the circumstances of the cases may be, and the fish be then sorted. When of the breeding kind, the smaller sorts are to be taken out for stocking other ponds, there being always a good stock of females left of the age of eight or nine years at least, as they rarely begin to breed before they have reached that length of time. In the main or feeding ponds it is useful to keep them as much as possible of an equal size and growth. In Sussex, where fish are much attended to in the view of profit, when the waters of ponds are removed for the purpose of restocking them, it is usually performed by means of stores of one year old, which are left to remain in them for four years. The car will then be twelve or thirteen inches in length, and where the waters are rich and good, fourteen or fifteen. The general seasons for taking off the waters of them for such use are those of the autumn or spring. One hundred such stores will there stock an acre of pond; and thirty-five brace of such as are ten or twelve inches in length are amply sufficient for a breeding-pond. The first year they will be three inches long; the second year seven; the third year from eleven to twelve; and the fourth year fourteen or fifteen, when they begin to breed.

In some cases in this district tench are left for two fishings of the ponds, as they are slow in their growth. In some large ponds three hundred store tench and as many store carp are put in as stock. The stores in these cases are of the value of ten shillings and sixpence the hundred. Male tench, when taken for use at table, are worth little or nothing; hen tench are only preserved. It is somewhat difficult to discover the difference between the two; but male perch are known by the shew of a milky fluid on being squeezed: tench, by the thickness of the fin of the males. Where the waters are of a good kind, about seventy two one-year old store carp, and as many tench, are a fair proportion for an acre of pond water.

In stocking ponds or other waters with eels, a few of any of the good sorts, in proportion to the sizes of the waters into which they are to be put, will be quite sufficient in almost every case.

STOCKING, SPAWNING, OR LAYING OYSTER-BEDS.

This is a business which is performed somewhat in the bed manner in many rivers and places, as those about the mouth of the Thames, at Wivenhoe, near Colchester, and in other places. The beds, layings, or stockings, in

these cases, are usually made in the openings, creeks, and other similar situations, near the sides and parts of the rivers and waters about where they open and discharge themselves into the sea, being partly supplied by the stocks for them from the rivers in these neighbourhoods, and partly from those which are in the vicinities of them, as well as from different places on the southern coasts of the island, and the northern parts of the French coast. The spawn or jelly-like substance which forms the oyster, and which is of the size of a half-penny, is deposited in the month of May, and adheres or sticks fast to bits of stones, the shells of old oysters, or any other such substances that may be thrown in the way by accident or any other causes. To these matters, which the oyster dredgers term *cultch*, whatever they may chance to be, the *spat* or spawn sticks, and is presently covered by a shell. The persons who are in the performance of this business dredge for the spat and small oysters in April and the succeeding month, take the spat from the cultch, and throw the latter substance into the water again, in order that it may serve the same use in a future year; as it is found that when there are no suitable matters for the spat fixing itself to, the oysters lessen in their quantity, and ultimately scarcely any are found for furnishing the spat. The spat, after being separated in this manner, together with the small oysters, are deposited carefully in the layers or beds; and after remaining there two, three, or more years, as circumstances may be, they afford the proprietors of the beds large supplies of extremely fine oysters. It mostly requires three or four years to have the oysters of the size in which they are commonly introduced to the table.

As the flavour and fullness of oysters in different situations and places where they are raised, vary much, probably on account of the nature, quality, or quantity of the food by which they are supplied in such cases, those places which afford the finest and best, and which are the most convenient in other respects, are fixed upon and supplied with spawn and small oysters which have been taken from other situations, and formed in the above manner into layers and artificial beds. In this way improvements in the cultivation, raising, and bettering of this valuable sort of shell-fish have been attempted and carried on in ancient as well as in the present times; but the most has been done in these respects, and the greatest benefits produced, within these last thirty or forty years, by selecting the best and most favourable spots for depositing the spat in, and choosing the most suitable and proper sorts of oysters as the stock in different cases. In these ways great increase in the quantities of oysters as food has been produced in many of the mouths of different rivers in Essex and some other counties. But in the fisheries of the breeding and raising rivers for these shell-fish in that district there is an uncertainty as to the quantity of oysters they may produce, as in some seasons a great quantity is afforded, at other times only a large sort of sprinkling, and sometimes scarcely any at all. However, they seldom all produce fully, or wholly fail, in the same season. The same is the case, in all probability, in other situations of these kinds of fisheries.

In some instances, large ponds and pits in salt marsh lands which are overflowed by the sea-water are converted to this use, which in some cases give to the oysters which are fed and raised in them a greenish cast and rather unpleasant taste, while in other cases of them that are fed and raised in nearly neighbouring spots of water of apparently the same kind, there is no acquisition of any such peculiarities of colour

or taste. There must, however, be something in the waters of such places that produces such effects, which should be well guarded against.

The oyster-fisheries of different parts of the country, and especially those of the above district, are of very great utility and importance to individuals and the public, as they not only afford use and profit in the produce of food which they supply, which is now become an article of both luxury and necessity, but as they employ great numbers of small vessels, and require the labour of many men. In the oyster fishery of the Blackwater river and others in that neighbourhood of the above county, there is much produce and employment; and West Mersea is a chief station for the dredgers, there being more than thirty boats belonging to the island almost constantly engaged in this sort of work. Vessels come from Kent to purchase the oysters, and some are sold at Wivenhoe, the situation of the Colchester beds. They are disposed of by the tub of two bushels, and are commonly from four to six shillings the tub. The size of a dredging-boat is from fourteen to thirty and forty tons burthen, with decks. The cost of them is 10*l.* a ton for the hull of the vessel alone. For the fitting out of one of twenty tons the sum of 150*l.* is required. And the labour of from two to four men is necessary for each vessel, who are paid by having shares in it; the master having also a share for the vessel. They go in the spring season to dredge on the coasts of Hampshire and Dorsetshire, and sometimes one hundred and thirty vessels of this sort are seen at work near Mersea. The earnings and benefits are large in this last case.

The vessels for this use will last from thirty to forty years, and they have been greatly on the increase for some late years.

There has been little variation in the price of this article of food in the above places for some time past, though the quantity consumed is scarcely to be calculated, but it cannot be stated at less than 14 or 20,000 bushels at the lowest; while the capital employed in the business may be from sixty to eighty thousand pounds, which strongly shews the importance of the culture and improvement of this and other shell-fish.

Section IV.—*Proper means of feeding Fish in Ponds and Stews.*

In the practice of feeding and bringing fish to the state of perfection in ponds and stews which are suitable for the purpose, it is proper that the waters be favourable to their growth, thriving, and taking on flesh and fat; that the natural food of them in the waters be of the right sort for the particular kinds of fish with which they are stocked; that the several additional articles made use of in the business be well suited to the nature and habits of the several sorts, and that they be preserved as much as can be of the same size and growth. It is necessary, also, that the times or seasons of the year for performing the work be well regarded, and that it be done in a proper manner, and in suitable parts of the ponds and waters.

The artificial feeding of fish, in some situations of these kinds, as those of the smaller stews and waters, is more wanted in the spring and summer months than in the winter ones, as those from the beginning of the spring to the middle of the autumn, as the fish in such waters, at these periods and in the other months, confine themselves, in cold times, more to the bottoms, and feed but little, being indisposed to move much about and come to the shallow parts, where it is most suitable and useful to let them have their fattening keep. It

is very easy, in this manner, to keep a very large stock, provided they be fully and regularly fed with proper sorts of food. There are many kinds of fish-fattening keep which are highly successful in this sort of practice, as for carp and tench, fresh brewers' grains, which cost but little in such feeding. The waste of household bread, either soaked or not in the grounds of malt liquor, and mixed up or not with roasted potato-flour, is very beneficial in its effects, one quart serving fifteen fish for a week, when fed twice a day. Many other sorts of substances, of a similar nature and quality, may be had recourse to with much success. But malt and peas, split or reduced into a rough, coarse, powdery state, will go the farthest, and have by far the best effects in giving flavour and firmness to the flesh. They may be used either in the soaked or unsoaked states, with nearly equal benefit, Every sort of grain may, indeed, be advantageously employed in this practice, when properly soaked and given to the fish. For those fish which are great devourers of small fry, as pike, perch, eels, and trout, waste animal substances, such as the small guts of sheep, and others of the same and other kinds, will be found to answer perfectly well in fattening them, and at the same time cost but little to the feeder in many cases. These modes of feeding may be very beneficial, convenient, and useful, in many cases, but they will be less necessary in cases where the ponds have streams passing through them, than where that is not the case.

In some countries, where ponds are so formed as to have the waters and fish of one of them emptied and put into another, the dry ones are ploughed up, and sown with grain of some proper sort, as barley or wheat, of which, when the crop is in ear, the water and fish are restored, and by feeding upon it in this state, become more readily fat than in any other method; the male fish being found to get sooner fat than the females in the practice.

There are different means made use of in giving the fish their food in these sorts of ponds and waters, as by letting suitable troughs or vessels for containing it be lowered down into them, from which all the food will be readily taken by the fish; but this expense and trouble may mostly be avoided, by merely having recourse to throwing these sorts of prepared feeding materials into the ponds and waters, as in that way the fish soon find them. They should always be fed near the mouths of such ponds, where there is but little depth of water, and where the bottoms are sandy or gravelly, if possible. The person who has the care and charge of this business should be perfectly regular and steady in performing the work, as it must be done as for poultry. Pike are to be fed with other voracious fish, such as perch, eels, and others of the same nature. Small ponds and stews must constantly be kept broken into holes in frosty weather.

USE OF STEWS.

These are principally useful as having the fish in readiness whenever they may be wanted for the table or other purposes; they should, of course, be always situated so as to be conveniently at hand. The number and extent of them must be regulated by the quantity of fish which are to be kept in such cases, but they need seldom to be of any great size, from two to three rods in length and width being commonly quite sufficient for such use. They should be formed in such a manner as to have the sides gently sloping to the middle parts, and the ends open and slightly shelving, so as the nets can be easily drawn through them. By having them made in this way, they will have sufficient depth in the centre parts for the fish

lying in safety, while they have the means of coming upon the shallows, which are pleasant to them, and at the same time cause them to thrive and feed in a better manner. Some sorts of fish improve greatly in such waters, as carp, tench, eels, and such sorts; but others, as perch, will often waste away, decline, and be destroyed in seasons which are inclined to be hot and sultry,

---

SECTION V.—*Quantity of Produce or Profit of Ponds and Waters of different kinds.*

THE amount of produce in fish, and the profit which they are capable of affording, must evidently be materially different in different circumstances and cases, as the growth and increase of them may be; but in many instances there will be an advantage which is not to be disregarded, as the trouble and expense are but little.

In many situations an acre of water, after having been two years stocked with proper fish, will yearly afford more than two hundred carp and one hundred tench, which will sell on the spot at one shilling each, which is a larger amount of profit than can be raised from lands of the same kind in any other way. In a pond of three acres, in a favourable fish-raising district, which was drawn after having been three years stocked with stores of one year old and growth, the produce was found to be one hundred and ninety-five pounds' weight of carp, and two hundred and thirty pounds' weight of tench, making together four hundred and twenty-five pounds' weight, which were disposed of for 20*l.* 10*s.*, or within a little of 2*l.* 6*s.* the acre yearly. Also that the same pond, stocked with tench alone, on being drawn three years afterwards, afforded about 26*l.* If it be supposed, that in a pond which supports 2,400 fish, half a pound each be yearly gained, it will be to the amount of 1,200 weight, which, at sixpence the pound, will be thirty pounds, and for an extent of fifteen acres, two pounds the acre, and at nine-pence, three pounds the acre, no profit to be despised in such cases of pond-waters.

Produce and profit at one fishing, in a pond of one acre and thirty poles, in the Sussex manner of managing pond fish:

	l.	*s.*	*d.*
125 Carp, weight 266*lbs.* at 6*d. per lb.*	5	10	10
22 ——— ——— 30*lbs.* at 4*d.* ———	0	10	0
	6	0	10
Store-fish sold	0	13	0
	6	13	10
Preserved fish for table use, in value	0	15	0
	7	8	10
Cost of fishing, &c. supposed to be	0	8	10
	7	0	0
Fished every three years, or annually by the acre	2	6	8

☞ This, besides a sufficiency to stock two ponds.

Pond-fish are usually regulated in their sale by measure, from the eye to the fork of the tail; when at 12 inches, carp are worth 2*l.* 10*s.* and 3*l.* the hundred; at 15 inches, 6*l.*; at 18 inches, 8*l.* and 9*l.* the hundred. When under 12 inches, tench 3*l.*; at 12 inches, 5*l.* 10*s.*; and at 14 inches, 7*l.* The profit, in all cases, depends very greatly on the nature of the stocking and management which is had recourse to in the raising of the fish.

SECTION VI.—*Manner of forming and using Nets and Hooks in taking Fish from Ponds and Waters.*

IN forming drag-nets in this intention, the meshes should not in any case be less than an inch and a quarter. And all such nets should at least have three times their lengths, and twice their depths, of the plain net parts, be-

fore they are fixed and hung to the corks and leads; as for example,—when the drag parts are to have ten yards in length and six feet in depth, which is not half so large as they are usually made, there is to be thirty of the net parts, both in length and breadth. Where sheet-nets are formed in the cod manner, they are to be let in, in the windings, with a sort of caul, so that in taking the fish, they may keep themselves properly open in the central parts. In the manner in which drag-nets are generally hung, it is easy for any person who is in the water when they are employed, to feel when the lines are completely hauled:—the line for the lead being above the calf of the leg, and often higher than the knee, and which continues so to nearly the bosom part of the net. The utility of such nets, in taking and getting fish out of ponds and waters, is very great in many cases.

In using a drag-net, there should constantly be two or three floats with it, as then one or two of them may be kept forward for the drag to be forced to; also, in fishing, the different poles and flews should always back the drag, which is that when the drag comes to near the first flew, that will, of course, be drawn to one or the other of the sides of the river: when, should any fish be in it, they are to be taken out; and when the drag-net has gone by the flew, be brought back into its former place. In case the fish, which are frightened by the drag, see an open part, and chance to escape underneath it, in consequence of the lines not keeping a due and regular sweep at the bottom part, they strike down with rapidity towards their old haunts, and by such means run headlong into the back flew of the net; the rendering the water muddy, by the trampling in it, and the rubbing of a part of the drag on the mud at the bottom of it, are greatly useful to the success in such cases, in which the best fish will constantly be taken. In using nets for ponds and rivers, the proper direction of the waters must be carefully regarded. These points are what are principally necessary in regard to the nets for taking fish of the pond and smaller river kinds, which should always be provided where such sorts of fishings are upon any large scale.

The representation of a proper hand net for taking up the fish out of ponds and waters that may be left after they have been in a great measure drawn off, for the purpose of getting them, is given at fig. 11 in the *plate*. And at fig. 9, in the *plate* is a *gorge* hook for taking pike, large eels &c. Fig. 10 in the *plate* likewise shews the form of the May-fly for trout.

MANNER OF PREPARING ROE-BAIT FOR TROUT.

This, which is considered by Mr. Seward, of Bull-head-court, Newgate-street, an experienced, ingenious, and intelligent fisherman, the most killing bait for trout, barbel, and some other kinds of such fish, of any, is the roe of the salmon properly prepared, and cured so as to keep for the season. He states, that it appears to have been wholly unknown to Walton, being probably discovered since his time; and that within these last forty years the use of this sort of roe has become known to such fishers as have had the means of preparing it in a sort of paste, so as to keep in a proper manner, and which, for good anglers, has been the general bait, the hooks from No. 9 to No. 12 being employed for the purpose.

This expert angler has, with much liberality, given the following method of preparing the salmon-roe as far the best for such uses.

IMPROVED PASTE SALMON-ROE BAIT.

The roe or spawn of the salmon being full grown and in perfection in the months of Oc-

tober or November, as the season may happen to be favourable, the roe is then to be taken and put into a basin with hot water, and stirred well for a few minutes; the water is then to be thrown away, and another similar quantity supplied in the boiling state, and stirred as before, thus adding and changing the waters until every corn of the roe be quite separated, and not the least grease or fatty matter remains. Then pour the corns into a clean sieve, and let them drain for half an hour, afterwards adding half the quantity of the roe of common salt, mixing them well together by means of the back part of a clean spoon, placing the whole in a dish before a gentle fire, and, as it becomes hard, let every corn be bruised with the spoon. It will then form a stiff pasty substance for use as bait. For keeping, it is to be afterwards pressed down into small pickling pots or jars, covered over with a slight layer of melted mutton suet, and tied over with a piece of wet bladder, when it will keep in the same circumstances as any pickle or preserve.

DISEASES OF FISH.

Fish are subject to few diseases of any kind, but those of some of the pond sort are occasionally liable to cease in their growth, gradually decline, get thin, and die, as the weather becomes hot in the summer months; probably, the only method of preventing this is by suitable and more full feeding, as such seasons come on. In some of the sea and river kinds of fish, as the salmon, there is sometimes a sort of scabby eruption beset with vermin about the neck and head, which are rubbed off as they pass up the shallow fresh-water rivers. In all sorts of fish worms are found to be greatly prevalent, but they are not supposed to be ever hurtful to them as producing disease.

APPLICATIONS AND USES OF THE WASTE MATTERS OF FISH.

The waste and saline matters of fish, in all cases where they take place in any sufficient quantity, should be carefully preserved in suitable places for the purpose, as they form an excellent manure, and by such means cleanliness would be much promoted, and have proper places for being thrown into, with suitable earthy substances, by which large supplies of manure would be raised, and much nuisance be removed from the streets and other parts of many large towns.

All fish-markets, too, should have proper depositaries of this nature near them, for securing such animal matters, as they would prevent much stench and filth.

The principles, practices, and methods, of improving all sorts of domestic live stock, have thus been fully inculcated and explained, and the various means of increasing the quantity of different kinds of animal food, in the fullest proportion, clearly pointed out and established.

It now only remains to remark, and it is confidently asserted, that all who will take the trouble to follow the directions and recommendations contained in these volumes, will speedily be convinced of their great utility and importance, not only to themselves, but to the public at large.

GENERAL INDEX TO THE FIRST VOLUME.

NEAT CATTLE.

ABRASION of parts in the bull, nature of, and the means of cure in, 338.
Absorbent or glandular system of vessels in the cow, nature and uses of stated and explained, 125.
Affections of the brain, what the nature of, and the means of cure in, 303.—Spasmodic, what in different cases, 305.—Of the aphthous kind, how removed, 314.
Age of neat cattle, discovered by the teeth and horns, 5.—Descriptions of the manner of determining it, 6.
After-birth, or cleaning after calving, nature of, and how to be managed in different cases, 159
Angleberries in, what their nature and manner of removal, 330.
Appetites of neat cattle in different cases, 5.
Application, means of in breeding cattle stock, and how best effected to produce benefit in, 37.
Aptitude for labour in, nature and cases of, and where it may be proper, 34.—What are requisites in, 35.
Art of cattle stock farmer, in what it consists, and its advantages, 69.
Arterial and venous systems of vessels in the cow, their uses explained, 121.
Axioms and principles in breeding live-stock, by which greatly improved, 8.—Descriptions of them, and the effects they produce in different cases, *ib.*—Great regard necessary to proper situation, to putting such together as are not too nearly related, and in crossing the families and breeds in a fit and exact manner, 10.

Bakewell, Mr. R., 1.—Exertions of, greatly useful and advantageous, *ib.*—Success of as a breeder, *ib.*—example of, cause of much emulation and advancement among stock-breeders, *ib.*
Beasts of pasture, what, 2.
Beeves, term of, how applied, 2.
Bison or large wild bull, 3.—Nature, situation, and description of, *ib.*—Distinctive marks of, *ib.*—Kinds of in different situations, *ib.*—Dwarf, nature of, *ib.*
Bites and stings of reptiles and insects in cattle, nature of, and means of remedying, 333.
Black cattle, nature of, 2.—Flesh in qualities of, *ib.*
Black-legs, quarter, *&c.*, nature of and what to be attended to in cases of, 301.
Blain, in cattle, nature of and how removed, 314.
Blood in breeding animals, what it signifies, 35.—Illustrations of its use and necessity, *ib.*
Blood, in neat cattle, nature and uses of, 347.
Blood-vessels in the cow, nature of explained, 121.
Bloody urine, in cattle, nature and circumstances of described, and the proper remedies pointed out, 326.
Bones, what necessary in respect to, 19.—Of neat cattle, nature and uses of, 351.
Bowels, inflammation of, nature of and what to be done in cases, of 296.
Brain and nerves, nature of in the cow described and explained, 136.
Brain, inflammation of, nature and means of cure in, 288.—Affections, their nature, circumstances, and means of cure explained, 303.
Breeds of cattle, foreign and of this country, 38.—Circumstances of each, *ib.*—Those most valuable, and how classed, *ib.*—Long-horned, description, origin, uses, and improvements of, *ib.*—Where found in most perfection, 39.—Account of the origin of the Dishley or improved long-horned sort, and of their qualities, 40.—Long-horned cattle, Craven variety of, 41.—Prinsep sort of, a most improved stock, *ib.*—Middle-horned kind, qualities for which much valued, where found most perfect, and how useful, 42.—Perfections and defects of, 43.—Description of by Lord Somerville, 44.—Station of this sort, 46.—This kind stand stall-feeding well, and come much towards perfection, being valuable in many respects, 47.—Sussex and Herefordshire varieties of this breed, descriptions and uses of explained, *ib.*—Alderney cattle, for what valuable, 64.—Nature and qualities of, and how produced, *ib.*—Often an unprofitable sort, 65.—Half long-horns, nature of and how raised, 52.—Which proper in different situations, 67.—Where the long, short, and middle-horned kinds are most suitable, *ib.*—For large milking, the short-horned the best of all, 68,—Tracts of pasture for which the three above principal sorts are most fit, 69.
Breeding cattle, principles and means of, 8.—axioms in, *ib.*—*In* and *in*, nature and circumstances of, 11.—Descriptions of its effects in all cases, and how it may be useful, *ib.*
Bruises and strains, circumstances of, and means of cure in, 341.
Bull, ox, and cow, importance of each in raising cattle stock, 72.—What should be attended to in, *ib.*—Description of proper form of, *ib.*—Correct proportion of parts in, material, 74.—Manner of rearing of and managing while young, *ib.*—Should never be suffered to leap too early, as being injurious, *ib.*—On what the proper time of depends, *ib.*—Vigour of, length of continuance of, *ib.*—Stock should be good and well bred in all cases, 75.—Not to be depended upon in the yoke, *ib.*—Inducing cows to take, nature of and means proper for, 93.—Organs and parts of generation in, severally described and explained, 127.
Bull, musk, where produced and met with, 4.—Nature of described, *ib.*
Bull-burut, nature of and means of cure in 338.
Butter, making, different practices in described, 222.—Putting down, potting, and tubbing, nature and manner of the practice in, 223.—Quantities of afforded in different cases, and circumstances of, 224.

Calves, young, pens for raising and other uses, nature and uses of, 178.
Castrating, young male neat cattle, how performed in, 346.
Cattle, black, what they signify, 2.—Neat, *ib.*—Large horned, *ib.*—Cud in, chewing of 6.—description of circumstances, and manner in which it takes place, 7.—benefits of, *ib.*—Principles and practices in breeding of, 8.—Axioms in directing it, *ib.*
Cheese-steep, nature and preparation of described, 217.
Cheese-making, nature of in the Cheshire and all the various sorts of explained, 227.—Cream, nature and making of, what, 232.—Cotterham, nature of, 233.—Pressing of, what necessary in, 235.—Methods of drying and preserving of, 235.—Becoming ripe in, how caused, *ib.*—Amount of produced in different circumstances and cases, 237.
Colic, different kinds of in cattle, how removed, 315.
Colour, in cattle, differences of not material, 20.—Supposed effects and benefits of each stated, *ib.*
Constitution, hardiness of, 25.—How produced, 27.
Constipation in neat cattle and calves, how produced, and what necessary in the removal of, 322.
Cows, properties of, in raising for milking and in other respects, 31.—The qualities of supplying milk in large quantity, and the disposition to fatten may be united in, 32.—Various remarks on, which tend to shew the possibility of this, *ib.*—Half long-horns, sort of, 52.—For large milking, the short-horned the best of all the breeds, sorts and varieties, *ib.*—Marks of good cows in providing of, 86.—Best stock of, supposed to be formed as described, *ib.*

—Other better-shaped sorts may sometimes be more valuable, 87.—Large sorts of, where proper and useful, *ib.*—Other less kinds, where most suitable, 88.—When inclined to fatten soon decline in milking, *ib.*—The large generally the most beneficial as not consuming more food than small ones, *ib.*—Raising of, proper means to be used in, *ib.*—Calving, what necessary to be done to, about the time of, 93.—Descriptions of the several parts of the skeleton of, 94.—Organs and parts of employed in producing young explained, 132. Calving, nature of, circumstances to be regarded in, and proper modes of treatment for, in different cases, 154.—Necessary management of on calving, 155.—Slipping or slinking calves, how caused, and what necessary in, 156.—Cleaning after calving, nature of it, and what is proper to be done when retained too long, 159,

Cow-keeping, for milk, nature of and practices in described, 183.—What necessary to be regarded in, 184.—More usual modes of foddering in, stated, 186.—New modes of keeping the cows in, 187.—Nature of the several sorts of substances in, described, *ib.*—Effects of such modes of feeding and keeping, what, 192.—Nature and manner of milking in, of much importance, *ib.*—What the best practices in it are, 193.—Nature of the customs in the sale of the milk in different cases, *ib.*—In dairying for butter and cheese, the various details of the practices in each described, 198.

Cow-pox, nature of the disease and cure described, 339.

Cramp, what is the nature of it, and how best removed, 305.

Cream, clotted, nature and preparation of, 234.

Crossing and mixing the breeds of cattle, its nature, effects, and uses, 13.—Cannot always be successfully employed, *ib.*—Description of the cases where beneficial and where the contrary, 14.—Considerations on, in different other points of view, as those of the anatomist and physiologist, 15.—Use of large males in, *ib.*—injuries of prevented by proper selection, *ib.*—Has proved most successful where females were large in proportion to males, *ib.*—Cause of this depends on the provision of nourishment for the young, *ib.*—Abundant nourishment necessary in the whole of the growth, for producing well-formed animals, on which large lungs have much effect, *ib.*—To effect which, is the most ready mode, when it is not carried too far, *ib.*—Character of the male more prevalent in, as shewn by examples of, *ib.*—Illustrations of bad effects of, *ib.*

Curd-cheese and new milk, how formed and prepared, 234.

Dairy-houses, nature and kinds of, and circumstances to be regarded in raising of, 194.—Descriptions of what is necessary in the raised kinds, 195.—In the sunk sorts, 196

Dairying, for butter and cheese, what necessary to be regarded in respect to the cleanness of the vessels and utensils used in, 198.—Lands and pastures proper for the different practices described, 199.—Suitable sorts of cows for each practice directed, 200.—Nature of the keep of the cows, and circumstances of described, 201.—Manner of feeding the pastures in, what, 203.—Proper times of milking the cows in, *ib.*—Nature and care of the milk, and the proper method of creaming described and explained in butter-making, 205.—Proper time of the milk standing for creaming, 211.—Creaming the milk, what to be attended to in, *ib.*—Nature of and means of properly keeping the cream in butter-making, 212.—Colouring butter and cheese, nature of and how performed, 214.—Churns and churning the cream for butter, what the nature of, and to be regarded in, 215.—Best and most proper season for cheese-making stated, but others answer well in many cases, 216.—Preparing steep for, manner of, and what necessary in, 217.—Forming and setting the curd for, nature of, and what is to be regarded in, 218.—Gathering of, and the proper reduction of it important, how to be properly performed, 221.

Derby-cheese, what its kind is, 231.

Descent, in breeding animals, that which regards the inherent natural properties, 35.—What is to be attended to with respect to it, *ib.*

Devonshire cattle, nature, faults, and uses of them described, 42.—Are estimable in many respects, 47.

Differences in the sorts of neat cattle, on what they depend, 37.

Dimensions of beasts of great growth and weight, 70.—Of an extraordinary ox, 71.

Diseases of neat cattle, and the remedies proper for in each, 280.—Influenza, or distemper, what, *ib.*

Discharges, large, from the bowels of, nature of, and how to be restrained, 317.—Dysentery, kinds of, what to be done in, 326.

Disposition of animals, on what it depends, 26.—How formed, and the uses and benefits of its being mild, *ib.*

Disposing cows to take the bull, suitable means for, 93.

Distribution of cattle stock most beneficial to improvement, 70.

Domestic breeds of cattle, origin of, 3.

Drink, cleansing for cows after calving, 157.

Dropsy, local, nature of and means of cure in, 305.

Drying and preserving cheese, what requisite in, in different cases, 236.

Drying cows of milk, what to be done in, 91.

Dun Suffolk breed of cattle, what desirable for, nature of described, and how to be improved, 60.

Dung-places in cattle yards, what necessary in described, 182.

Dung of neat cattle, nature and uses of described, 352.

Durham variety of improved short-horned cattle, circumstances and qualities of described, 54.—Superiority and weights of, *ib.*

Dutch lyrey sort of Yorkshire short-horned cattle, a bad, improper stock, 55.

Early perfection in live stock, 27.—Is greatly important to individuals and the public, *ib.*—What necessary in the promotion of, *ib.*

Edish cheese, nature of and how made, 233.

Eruptions on udder and teats of cows, 339.

Esophagus, nature of, and how formed in the cow, 109.

Ewe cheese, nature and qualities of, and how made, 233.

Excessive purgings, in cattle, nature of, and how removed, 317.

Exertions of Mr. R. Bakewell highly beneficial, 1.

Eye, nature, uses, and indications of described, 20.

Falling down of calf-bed, circumstances of and means of remedying explained, 160.

Fattened cattle, nature and manner of their being sold, 251

Feet-foul in, nature, circumstance and means of removal in, 337.

Fever, milk, nature, circumstances, and means of removing it explained, 162.

Fever, catarrhal, in neat cattle, nature of and means of removal described, 280.—Infections, pestilential, nature of stated and what necessary in, *ib.*

Flesh, nature and importance of 28.—On what its qualities depend, *ib.*—Variation of colour in, causes of, *ib.*—Marks of good in the living and dead states, *ib.*—Properties of connected with the fattening disposition, *ib.*—*Light* and *hard*, disadvantages of in raising stock, 27.—Perfection of as depending on breeding, what, 29.

Form of animals, what the nature of, 8.—That for human food described, *ib.*

Form of chest, size and capacity of essential, 8.—On what it depends, *ib.*—When narrow, very unfavourable, *ib.*

Forms of, that are most required and suitable, 21.

French breed of cattle, its nature, uses, benefits, and disadvantages stated, 64.

French sort of cows afford rich milk, which makes fine butter, and are generally useful where not much is required, 88.

Galloway breed of cattle, nature and value of, 58.

Glandular system of vessels in the cow stated and explained, 125.

Gloucester cheese, nature and qualities of, 230.

Gloucestershire old red and brown cattle, supposed to be of the middle-horned kind, 51.

Grazing cattle, nature and benefits of, 237.—Lands most suitable for the purpose, 238.—Proper stocking for, what necessary in, *ib.*—Breeds and sorts of used in different places, 241.—Those most useful in the practice described, 242.—Proportions of stocking, proper sizes of pasture, and modes of feeding them down, 243.—Times of turning upon, and the modes of managing stock on, described, 246.—Progress of increase of weight in, described and explained in different cases, 247.—Means most beneficial in stated, 249.—Good water required in, 250.—Modes of practice in stated, *ib.*—Nature and man-

ner of disposing of when fattened described, 251.
Great weight of oxen and the circumstances of, 70.
Green cheese, nature, manner of making, and qualities of, 232.
Gripes, different kinds of, described, and the means of removing, 315.
Grunting bull, a sort of bison, 4.—Where domesticated, *ib.*—Qualities of described, *ib.*

Hair, in cattle, nature and uses, 349.
Hardiness in animals greatly necessary, 26.—How it arises and on what it depends, *ib.*—What necessary to in producing it, 27.
Head, the proper form of 19.
Hearing, organs of, in cows described, 149.
Herefordshire variety of the Devon breed, what, 48.—Characteristic marks and uses of, *ib.*—True sort of, how formed, 49.—is a superior sort of cattle-stock for different purposes, *ib.*—Weight of, and what should be well attended to in breeding of, 50.—Qualities of the ox for labour, *ib.*
Heifers for labour, preference of to oxen, reasons for stated, 85.
Hide, nature, feel, and circumstances of, in different cases, 31.—Points and properties of to be principally attended to in raising stock of the cattle kind, *ib.*—Thin in Yorkshire breed, 52.
Hide, of neat cattle, nature and uses of, 348.
Hide-bound, in cattle, nature and means of removal in, 329.—Scabby knottiness in, nature and means of cure, 330.
Highland Kiloe breed, what its nature is, and in what situations prevalent, 60.—Probably only two original sorts of this kind of cattle, 61.—Nature of meat in, where met with, and weight of, 62.—The different varieties of described, *ib.*
Hoofs, in neat cattle, uses and nature of, 350.
Hoose and cough, circumstances of, and the nature of the means of cure, 307.
Horns of cattle, designed for what, 2.—Disadvantages and benefits of described, 19.—Serve to distinguish them and their qualities, 20.—Of neat cattle, nature and uses of, 349.
Horning of the neck of the calf-bed, nature of described, and what proper to be done in cases of, 160.
Houses, dairy, what is necessary and important in the different sorts, 194.
Hoven and overgorging in cattle, nature, circumstances, and means of relieving described, 311.
Hoving, in cheese, on what it depends, and the means of preventing, 222.

Improved management of live stock, 1.—Importance of, *ib.*—Cattle stock, raising of, what necessary in flesh of 28.—Sort of short-horned cattle, description and nature of, 54.—In what they are superior, *ib.*
Indigestion and loss of cud, what is its nature and the means of removing it, 309.—Sudden, nature and causes of, what, and the different means to be used in removing it, as those by pipe contrivances, stabbing, and in other ways, 311.
Inducing cows to take the bull, what requisite in, and means proper for. 93.
Inflammatory affection of the calf-bed, what is its nature and remedies, 162.—Fevers, with local affections of some parts, nature of, 288.—Affection of the brain, nature of and means of removal described, *ib.*
Inflammation of the lungs, nature, appearances, and means of removal described, 290.—Of coats of chest, what the nature of is and how removed, 293.—Of the stomach, nature of it, and means of removal described, 194.—Of bowels, circumstances of and remedies for, 296.—Of liver, what the nature of it is, and how removed, 297.—Of kidneys, what proper to be done in, 299.—Of bladder, nature of and suitable remedies in, 301.—General, what the nature of it is, and how to be removed, 302.
Integuments, surface common, in the cow, nature of and how formed, 102.
Internal parts of the cow, state and nature of each, 104.
Intestines in, nature and manner of formation of, 113.
Introductory observations on the rise, progress, and state of the art, *pref.*
Irish breed of cattle, what, 65.—Nature and sorts of, *ib.*—Much benefit would arise to that part of the kingdom by a better kind, *ib.*

Jaundice, in cattle, an affection of the liver, how formed, and the remedies proper for, 324.
Joint, shoulder, slip in, nature of means to be used in, 333.
Joints, knotty stiffnesses in, nature of and cure in, 334.—Rigidity and pain of, how removed, *ib.*—Inflammatory states of, nature and means of cure of, 335.—Rheumatic states of, what are the nature and the means of cure to be used in, *ib.*

Kentish home-bred mixed cattle, believed to be raised on the Devon and Sussex variety, 51.
Kiloe Highland breed of cattle, nature of, for what valuable, and how formed, 60.—Sort of cows for milk, and feeding, where proper, 88.
Kidneys and renal glands in the cow, structure and description of, 118.—Inflammation of, what to be done in cases of, 299.
Kinds of cattle most useful, and how arranged, 38.
Knowledge of improved stock and management, 1.—Greatly useful, *ib.*

Lameness in shoulder joint, description of and what to be done in, 333.
Largest improved cattle, where capable of being kept most profitably, 70.
Large-horned cattle, what they signify, 2.
Laryngal parts of the cow, circumstances of, 108.
Legs and feet, what necessary in the form of, 19.
Leigh cheese, nature and sort of, 231.
Lineage, what it imports in the breeding of animals, 35.—In what ways beneficial in this practice, *ib.*
Live stock, importance of improving the management of, 1.—Means of bettering it highly useful and necessary, *ib.*—Improvement of has much influence on the profits of, *ib.*—What it comprehends, 2.—Principles in breeding of, 8.—Axioms necessary in, *ib.*—Early maturity of highly beneficial, 27.
Liver and gall-bladder, nature and structure of in cows, 115.
Liver, inflammation of, description of, and what to be done in, 297.
Locked jaw, in cattle, nature of and means of removal described, 305.
Long-horned or Lancashire cattle, nature and qualities of in general, 38.—Half-nature of, 52.
Lungs, large, favourable in producing much nourishment for the suckling of young, 15.—Most readily effected by crossing, but should not be carried too far, *ib.*—Importance of size of animals, 18.—Inflammation of, what, 290.—Affections of, nature of, and what necessary in the cure of, 307.
Lye, or calf-bed, contraction or horning of, what is its nature and how removed, 160.
Lyrey Dutch sort of Yorkshire cattle, from their nature improper as stock, 55.

Male of the cattle kind, what necessary to attend to in raising of, 72.
Mange and scab on the skin in cattle, nature of and means of cure in, 331.
Maturity, early, an essential quality in animals. 27.—How promoted, *ib.*
Means used in forming this work on cattle, 2.
Means of grazing, which are most beneficial in different cases, 249.
Middle-horned breeds of cattle, properties for which most valued and important, 42.
Milk, property of largely supplying, important in cow-stock, 31.—How and by what means it is to be effected explained, *ib.*—Remarks on various points of such means in raising such cow-stock, 32.—In neat cattle, nature and uses of, 350.—Fever or affection, nature, circumstance, and means of cure of, 162.
Milking cows, the short-horns the largest in quantity of all the sorts, 68.—Nature and manner of performing, 90.
Mouth, parts useful in chewing the food, nature and circumstances of, 104.
Murrain, in neat cattle, what is its nature, and the description and cure of, 284.
Muscles in the cow, what necessary in, 98.—Descriptions of those belonging to the different parts, *ib.*
Musk-bull, where found, 4.—Nature of and how produced, *ib.*—Description of, *ib.*—Flesh good in quality, *ib.*

Neat cattle, which so called, 2.—All sorts originally wild, 3.—Best kinds domesticated, *ib.*—Characteristic descriptions of, *ib.*—Sorts of from which the different varieties have come, *ib.*—Names usually given to them in different cases, 5.—Some sorts of sooner in the state of maturity than others, *ib.*—Their manner of teething, as shewing their age, 5.—Principles and best means of breeding for them and other kinds, 8.—Axioms drawn from established facts and conclusions, on the subject, *ib.*—Suitable means in this way by which such stock become more valuable.

ib.—Proper sizes of in different cases, 26.—True principles of breeding, show how raised in the view of good flesh, 29.—Proper form of the neck in, 19.—Various breeds and sorts of 37.—Foreign breeds and kinds, *ib.*—Nature of and where found the largest and best, *ib.*—Little regard paid in raising them, 38.—Breeds and sorts of this country, *ib.*—How far suitable or contrary to the situations in which they are found, *ib.*—Most distinguished kinds of, and circumstances by which classed, *ib.*—Long-horned, nature, uses, and description of *ib.*—Manner of the rise of the improved long-horned kind, 40.—Great value of Mr. Prinsep's breed of, 41.—Middle-horned sort, nature, circumstances, qualities, perfections, and faults of, 42.—Sussex variety of this kind, nature, properties, and uses of explained, 47.—Short-horned, nature and uses of, 51.—Welch breed, nature and qualities of in the different sorts, 55.—Suffolk dun breed, nature and value of, 59.—Highland Kiloe, or Scotch breed or kind, where met with, 60.—Alderney or French breed, description of and purposes for which valuable or the contrary, 64.—How they may be improved for milking, 65.—Irish breed of, indifferent, *ib.*—Much benefit would be produced by a better sort, *ib.*—Northern half-long-horns, how produced, 53.—Sorts of, proper for different situations and circumstances, 65.—What are their excellences and defects, 66.—Which sort most suitable for different situations and exposures, 67.—Short-horned, largest milkers, 68.—Cow-stock, nature of different sorts, 85.—Nervous system of, distribution and general nature of 139.—Store stock of, may be raised and kept to great advantage, 176.—Store-stock, yards, &c., proper for, with suitable plans and stalls described, 181.—Stock, grazing and summer pasture feeding and fattening, nature of described, 237.

Operation of milking cows, regular nature and circumstances of, 90.

Organs of generation in the bull, nature and circumstances of described, 127.—And parts of production of young in the cow described and explained, 132.—And parts necessary to the performance of many important functions, as those of touch, taste, smelling, hearing, vision, voice, and defence, described and explained, 143.

Origin of all sorts of neat cattle, 4.—From the urus and bison, *ib.*

Ox, means by which made, and the effects of, 75.

Oxen, nature of, how various, what necessary in regard to kinds and raising of, 75.—In labour, supposed utility of not well founded or so proper as the horse, *ib.*—Question of, fully examined, considered, and decided in favour of the horse, *ib.*—Raising of such stock not more beneficial than that of the horse kind, as a larger quantity of beef is not thereby produced, 77.—Are greatly objectionable in many cases of team-work, 78.—Cases where a few may perhaps be employed with advantage, *ib.*—Ends for which they have been advised sadly mistaken, *ib.*—Proper kinds of, when for working, described, 79.—Methods of training and breaking in for work explained, *ib.*—Modes of working, which preferable in, 80.—What necessary in bringing them up while young, whether for labour or sale, *ib.*—For work, necessity of their being shod, and the manner of performing it, 81.—Keeping of for work and profit, manner of and statements on, in a full trial, *ib.*—Preference of heifers to for work, reasons of, 85.

Pancreas and spleen, nature of described, 116.

Pelvis, what necessary in the form of, and how discovered, 18.

Pens for raising young calves in, nature of, and what important in, 178.—Proper conveniences in, and nature of floors for, *&c.*, 180.

Peritoneum, structure and uses of, 118.

Pharyngal parts in the cow, how formed, 108.

Poisons, internal, what is their nature and the means of removal, 328.

Polled Yorkshire short-horned cattle, what the nature and qualities of them are, and how useful, 34.—Galloway breed of cattle, importance and description of, 58.—Nature and value of in different respects, and how to be improved in its native situation, 59.

Practice in raising cow-stock, what requisite in, 88.

Practices in cow-keeping, for milk, nature and circumstances of, in different cases stated, 183.—What proper to be attended to in, 184.—General methods of feeding described, 186.—New modes of, manner of keeping in, 187.—Nature of the different substances used in stated, *ib.*—What the nature of the effects produced by are, 192.—In the milking of, there is much of importance, *ib.*—Most proper plan stated, 193.—Circumstances in respect to the milk, what, *ib.*—In butter-making, nature and manner of described, 222.—In potting and tubbing butter, the manner of described, 223.—Cheese-making, in the Parmesan and all the different kinds, the nature of each described and explained, 227.

Practices, various, in summer and winter feeding and fattening cattle, described and explained, 237.

Presentations, in calving, nature and description of the different kinds of, 157.—What necessary to be done in time of, and afterwards, 158.

Pressing cheese, what requisite in, and how formed, 235.

Principles and methods of breeding neat cattle and all sorts of live stock, 8.—Suitable combinations and connexions of in different cases, described, *ib.*

Process of milking cows, what necessary in, 90.

Production, parts for, in the cow, nature and uses of described, 132.

Propensity to fatten in cattle, on what supposed to depend, 30.—Circumstances to be chiefly regarded in improving it, *ib.*

Proportion of labouring cattle-stock to land as farms, nature of and what required in 85.

Putting cows to the bull, nature and proper time of, in different cases, 89.—What necessary in described, 90.

Quantities of butter produced from different proportions of milk, in various cases of cows, and modes of feeding them, 224.—Of cheese produced from different sorts of cows, and proportions of milk, and other profits of, 237.

Rearing calves and young store stock, nature and manner of, in different places, described, 158.

Reasons for some breeds of cattle being better than others in different cases, 65.

Refuse matters and parts of neat cattle, nature and uses of described, 347.—Blood, *ib.*—Fat and marrow, 348.—Hide, *ib.*—Sinews, 349.—Hair, *ib.*—Horns, *ib.*—Hoofs, 350.—Milk, *ib.*—Urine, liver, gall, and spleen, *ib.*—Bones, 351.—Dung, 352.

Remarks, introductory, on the nature of the rise, progress, and state of the art, i. *pref.*

Renal glands in the cow, nature of, 118.

Rendering cows dry of milk, circumstances of described, 91.—Where necessary, and proper suitable means for, 92.

Retroversion of the calf-bed, nature of the accident, and how to be removed in the best manner, 160.

Ripening of cheese, nature of and how promoted, 235.

Ruminant animals, nature of, 6.—Parts how formed for, *ib.*—Have always more stomachs than one, *ib.*—Process, how effected in, and its uses, 7.

Salivary glands in the cow, peculiarities and nature of described, 108.

Salting cheese, nature and manner of, 235.

Scour and looseness, nature of, and means of cure stated, 317.—And skit in calves, nature of, and means of removal, 321.

Scotch Lowland breed of cattle, what the nature of, 58.

Season of cheese-making, what in different cases, 216.

Selection, when properly conducted, is so greatly useful in breeding cattle-stock, as hardly to be supposed, 10.—Its proper uses described, *ib.*—Proper regard to, in providing and raising male stock, has had the best effects, 11.

Selling fattened cattle, nature of stated, 251.

Shape, nature of, the true, 18.—Of that which is most suitable in the intention of food, *ib.*—Of chest, which is most proper, *ib.*—Cattle most requisite and useful described, 21.

Short-horned breed of cattle, nature and kinds of, and in what it differs from other sorts, 51.—Description and uses of, *ib.*—Where met with, and how brought into the country, *ib.*—In what its superiority consists, and how any faults it may have are to be removed, 53.

Shoulder, slip in, nature of, and how to be cured, 333.

Sinews in cattle, nature and uses of, 349.

Sizes of animals, which are most proper and beneficial in different cases, fully exa-

mined, discussed, and ascertained, 23.—Those which are large, when of the improved sort, generally most proper, 26.
Skeleton of the cow, description of the several parts of, 94.
Skim milk cheese, nature of, 231.
Skin, circumstances and nature of in different respects, 31.
Slip coat thin cheese, nature and properties of, what, 233.
Small Scotch cattle, where most suitable, 70.
Soiling cattle in houses and yards, nature and sorts of food proper for, 252.—Advantages of and objections to stated, *ib.*—Benefits of in producing manure in, 255.—Buildings and conveniences proper for, 256.—Manner of cultivating and using proper crops for, 257.—Necessary sorts of litter in, and benefits of the practice, 259.
Sores, oozy, itching in the skin, in cattle, nature of and means of removing, 331.
Sorts of cattle most proper in different circumstances, and kinds of pastures, 67.
Spasm, what its nature is, and the means to be used in, 305.
Spasmodic affection, nature of, and means to be used in different cases of, *ib.*
Spaying female neat cattle, how executed, 346.
Spleen, nature of, described, 117.
Staggers, what the nature and means of cure of, 303.
Stall-feeding cattle, nature, modes, and times of described, 260.—Buildings proper for this use, 261.—Principles on which the process depends, 265.—Different sorts of food and proportions used in, described, 264.—Progress and proportions of increase of flesh, bone, &c. stated, 176.—Advantages in, nature of in different ways, 180.
State, fœtal, and mode of support of the calf when just calved, 135.
Stilton cheese, nature and qualities of, 229.
Stings and bites of hurtful insects and reptiles, nature of, and how to be removed, 333.
Stock cattle, circumstances to be regarded in the flesh in raising of, 28.—Fitness for labour in, 34.
Stock cow, descriptions of the nature, qualities, and uses of the several kinds of, 86.
Stomach in the cow, nature and formation of 110.—Absorbent vessels of, stated, 125.
Stomach, inflammation of, what the nature and means of cure in, 294.
Stomachs, difference of those in animals which ruminate and which do not, 8.—Those in the former more complex, *ib.*
Store, neat cattle stock, may be rendered highly beneficial in many places, 176.—Should be well supported in winter, 177.—Practices of tying up and keeping loose, when most beneficial, *ib.*
Strains and bruises in cattle, nature of, and how cured, 341.
Strangury, in cattle, what the nature and cure, 328.
Success in breeding cattle-stock, 36.—What necessary to in, *ib.*—Means of and how best applied, 37.
Suckling calves, in fattening for veal, nature and practices of, and where most successful, 163.—Cows, conveniences most proper for the system, *ib.*—Different methods of described, and the means used in, 164.—Length of time required in, which is most beneficial, 167.—Advantages of, alive and dead, weights in different cases, 168.—Most material improvements in the practice, 168.
Suffolk dun breed of cattle stock, what is the nature, form, and uses of, 59.—Description and value of, 60.—How improved for feeding and milking, *ib.*
Surface integuments of the cow, state and circumstances of, 102.
Surfeit in neat cattle, nature and cure of, 330.
Surluc or grunting bull, what, 4.—Where found and description of, *ib.*—Purposes for which the tail is useful, *ib.*
Sussex and Herefordshire varieties of Devon cattle, nature and uses of, 37.—Variety of, for what most esteemed, *ib.*—Nature, description, and circumstances of, *ib.*—Compared with Devon sort, what, 48.—Has much resemblance to that sort, *ib.*—For what principally valued, *ib.*
System of blood-vessels, arterial and venal, in the cow explained, 121.
System, nervous, in cattle, nature and explanation of, 136.
Systems of grazing most had recourse to described, 250.
Swellings in udders in cows, nature and modes of cure in, 339.

Tail-rot in neat cattle, nature of and how to be removed, 334.
Teats of cattle, cracks and sores in, nature of and cure in, 341.
Teeswater improved short-horned variety of cattle, nature of, 54.—In what respects they excel, *ib.*
Teeth and horns denote the age of neat cattle, 6.
Teeth, in the cow, nature and manner of the formation of, 104.
Thin hides or skins in this sort of cattle, nature of, and how injurious, 52.
Throat, nature and formation of in the cow, 109.
Thyroid gland in the cow, nature and circumstances of what, 107.
Time of calving what to be done about, 93.
Tongue in the cow, nature, construction, and uses of, 107.
Trachea, thyroid gland, and lungs, in the cow, nature of described and elucidated, 126.
Trent-side thin cheese, how made and qualities of, 233.
Tubbing or potting butter, nature and means of the practices used in, 223.
Tumours, hard, small, in the skin, nature and removal of, 332.
Turning in the head, the nature of the disease, and means of removing described, 303.
Tweed-side short horns, what, 53.
Tying the navel-string in calves, how performed, and what requisite in, 159.

Udder and teats in cows, eruptions on, 339.—Collections of matter in, nature of and means of cure, *ib.*
Ulcerating abscesses in the feet of cattle, nature of and practices in their removal, 337.
Ulcers in neat cattle, nature of, and how cured, 346.
Urinary passage and shape in cattle, irritations in, what the nature of and means of cure, 329.
Urinary bladder in, nature and structure of described, 119.
Urine of cows, nature and constituent properties of described, 119.
Urine, liver, gall, and spleen, nature and uses of, 350.
Urine and dung, preserving of in cattle yards, what proper for in the nature of 182.—Suppression of in cattle, nature of and means of cure, 328.
Urus, or common wild bull, 3.—Nature, situation and description of, *ib.*
Uses of the refuse matters of neat cattle, nature of, 347.
Uterus in the cow, nature, structure, and changes of in the gravid state explained, 133.

Varieties of neat cattle, how produced, 3.—Sussex and Herefordshire, nature and make of described, 47.—Weight to which they rise and uses to which put, *ib.*—Suffolk dun, what the nature, form, and uses of are, 59.—Half long horn, what, 53.—Highland Kiloe cattle, nature, qualities, and descriptions of, and where raised, 62.—Irish, nature of, what, 65.—Ways in which improvement might be produced in, *ib.*
Veal, suckling fattening calves for, nature, circumstances, modes, and benefits of, 163.
Venomous reptiles and insects, bites and stings of, nature of and means of cure in, 333.
Vermin in the skin, nature and cure of, 332.
Viscera, thoracic and abdominal, of the cow described and explained, 104.
Vision, organs concerned in, nature of, 149.
Vital temperature, state of in different domestic animals, 123.
Voice, organs for producing, nature of, 152.

Warbles in cattle, what the nature of and means of removal of, 332.
Warty excrescences in cattle, what the nature of and the means of cure, 330.
Water, red and black, in neat cattle, nature of, the affections and remedies in described, 326.
Weaning and rearing of calves and young store stock, manner of described in different circumstances and cases, 168.—Best methods of concluded to be those described, 175.
Weight and profit, progress of, increase of in pasture feeding and fattening cattle stated in different cases, 147.
Weight, large of oxen, and dimensions, and circumstances of, 70.—Short-horned sort, best in these respects when of the best kinds, 71.
Welch breed and varieties of cattle described, 55.—May have been two breeds of originally, *ib.*—Difference in the varieties of,

in the several districts of that country stated, 56.—nature of the large and small sorts of these cattle, 57.—Usual weight of, in the different kinds, 58.—But little improvement yet made in, *ib.*
Whey-butter, nature, circumstances, and uses of, 227.
Wiltshire cheese, what the nature and difference of, 231.
Winter fattening cattle in suitable stalls and places, nature, various modes, means, uses, and benefits of, 260.
Wounds in neat cattle, nature and difference of, and the means of cure in, 342.

Yards and conveniences proper for store cattle stock described, 181.
Yards and buildings necessary in summer soiling cattle 256.
Yellows in cattle, nature of and remedies proper for, 324.
York cream cheese, nature of and how made, 256.
Yorkshire breed of short-horned cattle, what, 51.—Description of, and the nature and qualities in the several sorts, *ib.*—Polled sort of these cattle, nature, circumstances, and properties of stated, 54.—Cows of afford most milk of any, 68.
Young calves and store stock, various modes of weaning and rearing of described, 168.—Sort of pens and contrivances for rearing of, described, 178.—Nature of floors in for raising or suckling, which are most proper, 180.
Young of neat cattle, cutting and spaying of, how performed, 346.
Zebu, what its nature is, 4.

GENERAL INDEX TO VOL. II.

SHEEP.

Affections, glandular, in the lungs of sheep, nature of 17.—Of the eyes in sheep, nature of, and what to be done in the different cases of, 33.—Stiff in the legs, nature and causes of, and means of cure in, 42.—Rheumatic in the joints, nature and means of removal of, *ib.*

Bites and stings, nature and cure of, 33.
Blood-stricking and blood in sheep, nature, causes, signs, and means of curing in, 2.

Carding wool, what requisite in, the qualities and properties of, 67.
Catarrhal fever, nature, causes, and marks of, and means of cure in, what, 1.
Combing wool, what most suitable and proper in, the nature and qualities for different uses, 68.
Cramp in legs, nature and cure of, 42.
Cutting male lambs, when most proper, manner of the execution of, and matters necessary to be attended to in, 46.

Daise in sheep, nature of the disorder, and the means of the removal of, 11.
Dropsy in sheep, nature of, and how to be removed, 26.
Dysenteric and contagious scour, what the nature and means of cure in are, 20.

Effects on the skin of sheep by the fly and maggot, what, and how removed, 39.
External accidents of the wound and bite kinds, nature and circumstances of, and what necessary in the cure, 44.

Fever, general, inflammatory, and with local affection of particular parts, nature, description and means of cure in different states and instances of, 2.
Fitting wool for manufacturing purposes, nature of, and how to be effected, 62.
Fly and maggot, effects of on the skin, nature of, how prevented, 32.
Foot-halt and rot, nature and circumstances of, and methods of cure in, 42.

Gid or turn in the head, what its nature is and how cured, 12.

Head, and brain affection of, nature, circumstances, appearances, and means of cure, 8.—Water in, states of and what to be done in, 12.—External sores on, what is the nature of, and modes of cure in, 32.

Indigestion, nature of the causes of, and the remedies proper for, 18.
Inflammatory fever, general, and with local affection, signs, nature, and circumstances of in different cases, with the means of prevention and cure in, 2.—Obstruction in internal parts, nature, circumstances, and appearances of, and means of cure in, 17.
Internal bowel parts of sheep uses of, 50.

Jaundice in sheep, nature, causes, and cure of, 27.
Joints, stiff, nature of and remedies for, 42.

Lamb's wool, nature and qualities of, and uses for which proper, 71.
Leaping, ill in sheep, causes and signs of the disease, and the manner of removing it, 8.—In lambs, nature of, and remedies proper for, 11.
Leg-evil, nature, state, appearances, and modes of cure in, 40.
Legs, stiff, circumstances of, and cure in, 42.
Liver, affections of, 27.
Local dropsy in the head, description and nature of, and remedies in, 12.

Markets, wool, what should be the nature and regulations in, 75.
Means of working wool improved, nature of and machinery used in described and explained, 78.
Means of prevention and cure in common scours, nature of, 22.—In the white and green kinds, 24.—In the yellow kind, *ib.*—In the grass kind, *ib.*—In the dysenteric kind, *ib.*
Megrims, what the nature and circumstances of, 45.

Nipples in sheep, sore, states of, and how cured, 40.
Nose worms, itching, what caused by, nature of them, and the means of removing the itching in, 45.

Paralysis in sheep, nature, causes, and means of relief in, 8.—In lambs, nature of the causes by which produced, and the remedies useful in, 11.
Pinding, obstructions caused by in lambs, nature of and manner of removal in, 25.
Pine in sheep, what the nature of, and means to be used in, 11.

Qualities of wool, nature of, 63.
Quantity of produced in England and Wales, what, 78.

Rams, old, twitching of, what necessary in, and how performed, 46.
Red and black water in sheep, nature of and means of cure in, 17.
Rot in sheep, nature, causes, origin, and cure of, 28.

Scab in sheep, nature, causes, and different means of cure in, 35.
Scour in sheep and lambs, nature and different kinds of, and methods of cure in each, 19.
Sheep, wool of, qualities of in the produce of different sorts of in various districts, 52.
Sheep, laws relating to, 82.
Sheep-lice, what the nature of, 38.
Sheep's trotters, nature of the use of, 48.
Sickness in sheep, what the nature, causes, appearances, and means of cure in it are, 2.
Skin, sheep's, nature, uses, and manner of disposing of, 48.
Skin and pelt wool, nature, properties, and quantities of, 70.
Skin, red, scabby, watery blisters in, nature of, and means of removing, 36.
Skin, erysipelatous inflammation of, what necessary in the removal of, 37.
Skin, the effects of fly and maggot on, and how removed, 39.
Sores, scabby on the tail of sheep, what should be done in cases of, 37.
Sores in udder and nipples of sheep, nature of and cure in, 40.

Sore heads, external, nature, rise, and means of cure in, 32.
Sorting wool, nature, manner, and states of executing it in considered, 64.
Splitting sheep skins, nature of the process of, sorts proper for, and benefits of, 49.
Stabs and clips in shearing sheep, nature of, and what necessary in the cure of, 44.
Staggers in, what is the nature of and means of cure in, 16.
Stings and bites in sheep, circumstances and effects of, and means to be used in, 33.
Sturdy in, states and nature of, and the means of cure pointed out, 12.
Swellings, glandular, in the udder, nature and circumstances of, and means of cure, 40.
Swelling in the legs, nature and circumstances of and means of cure in, 40.

Tabular view of the amount of wool of different kinds, and breadths of lands in sheep districts of this country, 60.—Statements of such, how to be taken in forming conclusions on, 62.
Tick sheep, nature and action of, 38.
Trotters, sheeps', manner of using of, 48.
Tag, in sheep, nature of, and what to be done in, 37.
Turn in the head, what it arises from, states and circumstances of, and how to be cured in different cases, 12.
Twitching old rams, nature and manner of performing the operation, 46.

Udder, in sheep, hard inflammatory tumours in, nature and cure of, 40.
Udders and nipples in, sore, states of and how removed, 40.
Ulcerating, inflammatory, blistering swellings in legs of, nature of, where common, and means of cure in, 40.—Sores in feet, nature and causes of and modes of cure in, 42.
Urine and dung, nature of, and how to be used to the most advantage, 47.
Uses to which the more waste parts of sheep are applied, 47.

Venomous animals, stings and bites of, what the nature, effects, and means of cure in are, 33.
Vermin, affecting the skin, nature and kinds and circumstances of, and the different means of cure and removal, 38.

Wasting in sheep, where usually met with, and how to be removed, 11.—Glandular affections of the lungs, nature, causes, and injurious effects of, 17.
Water in the head, nature of, and modes of cure in, 12.
Water-red in sheep, nature, state and circumstances, and means of cure, 17.
Water sickness in sheep, the nature and means of curing of, 26.
Watery poke in sheep, what, 28.
Weights of coats of different sorts of sheep, what, 62.
White film on eyes in sheep, nature of, 33.
Whitlow in feet, how caused and removed, 42.
Wild-fire in sheep, nature of, and what necessary in the cure, 37.
Wool of sheep, means of classing of in the long and short, 50.—Nature of produced by the different breeds and varieties of in the several parts of the kingdom, 52.—Long kinds of, in the sheep of several districts of, *ib.*—Short sorts of in the sheep of different districts of, 54.—Tabular view of breadths of land, and produce of in different districts and sorts, 60.—Fitting it for manufacturing uses, nature and circumstances of, 62.—Qualities of, nature of and how affected by different causes, 63.—Yolk of, how the properties are affected by, 64.—Sorting of, manner of described, and sorts of into which divided in different cases, *ib.*—Skin and pelt, nature, properties, uses, and quantities of, what, 70.—Lamb's, qualities of, circumstances in, and uses proper for, *ib.*—Softness in, nature of and on what it depends, 71.—Fitting in, nature of, and the material benefits derived from, 72.—Staple of, soundness and trueness, where material, and what the nature of, *ib.*—Colour of, what it should be, and how to be produced, *ib.* Cleanness of, where detrimental, and how to be improved in this respect in different cases, 73.—Sweating, nature and injuries of and dangers from explained, 74.—Weight of, how material, *ib.*—Smell of, what it should be, *ib.*—Fleeces of, how arranged and described, *ib.*—Markets for, nature and modes of, and better regulations and means for proposed, 75.—What to be expected in the improvements in, 78.—Improved means of working of, implements and machinery proper for each stated, under their proper heads, 80.—And sheep, laws relating to, 82.

Yellows in sheep, nature and causes of, and how to be removed, 27.
Yolk in wool, how it influences and affects the properties of, 63.

GOATS.

Activity and nimbleness of goats, 92.
Advantages of the several sorts, 88.
Affections, inflammatory, in lungs, chest, and bowels, how to be removed, 97.
African dwarf sort, nature and description of, 88.
Age of, shown in the same ways as in sheep, 84.—Length of, what, 92.
Angora, fine fleeced, where found, and the description and importance of, 87.
Appellatives of, what, 84.

Buck of Judah, uses and benefits of, 89.

Cashmere kind, what the description and nature of, and the probable use of the introduction of here, 88.—Have been introduced into France with much benefit, *ib.*
Catarrhal affections in goats, nature and descriptions of, and the means of cure in, 94.
Costiveness in, nature of and what necessary to be done in the removal of, 95.
Cottager, uses of the goat to, 91.

Diseases of goats, what the nature of, 94.
Domestic common sorts, what, 86.—Nature of and how raised, *ib.*
Dung of, state and nature of, 100.
Dwarf sort, form, nature, and uses of, 88.

Egypt, skins brought from, how rendered of little value, 99.

Flesh of, nature and qualities of in different ages of the goat, 98.

Goat, characteristic description of, 84.
Goats, domestic, in what cases beneficial and important, 84.—What necessary to be regarded in, nature, provision, breeding, rearing, feeding, and managing of, 89—Have hitherto been too much neglected, 91.—Are capable of much improvement by proper care in breeding and rearing, 92.

Habits and economy, the uses and advantages of in many different ways, 89.
Hair of, how useful, 99.
He-goat, what necessary in, in providing for breeding use, 92.
Horns of, for what beneficial, *ib.*

Inflammation of the feet, nature and cure of, 97.
Inflammatory states of internal parts, signs of, and methods of cure in, 97.

Judah, buck of, description of, and where found, 89.

Kid, young, flesh of, fine and delicate as food, 98.—Skin of, for what use particularly suited, 99.

Lameness in the feet, state and nature of, and what proper to be done in, 97.
Large milking sort, uses and importance of, 89.
Looseness, how it arises, signs of, means of prevention and cure, 96.

Milk, nature and qualities of, and where greatly useful, 98.

Names, particular of, what, 84.
Nature of different, how to be selected for particular uses, 98.

Origin of domestic sort most probably from the wild, 85.

Portugal large sort, utility of for milking in many situations, 89.
Products and parts of the goat, how to be chosen for nature of, and uses to which applied, 98.

Rot and scab, what necessary in the treatof, 98.
Scab and rot, necessary treatment in, 98.
Scour, explanations of the nature and cure of, 90.
She-goat, what proper in the choice of for propagation, 88.—May be very beneficial in rearing young weak lambs, and assisting in the fattening of those of the house and grass kinds, *ib.*—What she is capable of even in bad cases of, 93.—What necessary in the rearing and managing the young in raising them, 94.
Skin of, useful for what purposes, 99.—Difference in the value of different sorts when dressed, and how improved in value by dyeing, *ib.*
Sorts of, how different, 84.
Spayed goat, flesh particularly fine, 98.
Suet, goat's, quality of, excellent, 98.
Syrian kind, where met with, and the description, distinction, and uses of, 88.
Tallow in, highly valuable, 98.
Teething in, nature of, 84.
Usual names of, what the nature of, 84.
Value of skins of, and how improved by properly dressing, 99.
Widowan sort, where met with, and circumstances of, 89.
Wild, natural sorts, nature and descriptions of, and where met with, 85.

DEER.

Age of, somewhat shewn by the horns, and some other parts, 100.—Short in duration, 102.
Appellatives of, what, 100.
Breeding and rearing, of what necessary in, 103.
Buck, description of, and what necessary in for venison, 102.
Carcass of, when killed, how to be sent for sale, 106.
Deer, nature, uses, and description of, 160.—For venison, sort of, 101.—Habits, nature, uses, properties of, *ib.*—Two kinds supposed to be useful for, *ib.*—Distinctions between it and the stag, *ib.*—Uses to which capable of being profitably applied, 103.—Circumstances to be regarded in breeding, rearing, feeding, and managing of, *ib.*—Young, means of practice with, which are highly profitable, 104.—Fattening of, most proper manner for, 105,—How the management and profits of may be improved, 106.—Products and parts of, how applied, 107.—Flesh of, nature and circumstances of, *ib.*—Suet of, valuable qualities and properties of, *ib.*—Dung of, circumstances of, and how made useful manure, 108.
Diseases, state and circumstances of in, 106.
Doe, circumstances of and what necessary in, 103.
Flesh, nature, circumstances, and states of 107.
Horns state of in shedding, 102.—Uses to which put, and circumstances of, 107.
Names, particular, of, 100.
Origin of, how supposed to have taken place, 101.
Practices, beneficial, with young deer not to be kept, 104.
Season for killing of, the usual one, 106.—How to be sent to market, and in the best and most profitable manner, *ib.*
Skin, value of, how to be prepared, 107.
Skit in, what is the nature and circumstances of, and the means of cure of, in young and old deer, 106.
Sort of proper for venison, 101.—Nature, habits, uses, and other circumstances of, *ib.*
Suet, nature of in, 107.
Teething in, somewhat similar to sheep, 101.
Uses to which they may be applied with profit, 103.
Usual names of, what, 100.
Venison, situations best for the production of, 105.—Where the finest is raised, *ib.*—What increases the flavour of, *ib.*

HORSES.

Affections, paralytic, how produced and cured, 138—Epileptic, the nature of, and means of removal, 190—Colicky, description of, and method of cure in, *ib.*—Of the eyes, what the different nature of, 208.—Of joints of bones in the legs, nature of, 219.—Of the skin underneath the knee, nature and cure of, 223.—Of the feet, what the nature of, 225.
Age of, shewn by the teething of, 109.—Proper for getting young in stallions, 126.
Appellatives of, nature of, 107.
Bars of the mouth, how affected, 212.
Bites and stings, effects of, how removed, 235.
Bladder, inflammation of, nature and circumstances of, and how to be removed, 185.
Blistering of, what required in, and circumstances of, 173.
Blood and bones, how useful, 270.
Blood spavin, state of, and cure in, 217.
Bog spavin, description, nature, and cure of, *ib.*
Bones of different parts, 254.
Bony structure of, nature of, and how divided, 253.
Bowels, profuse discharges from, what the nature and causes of, and methods of removing, 192.
Break, state of, and means of cure in, 234.
Breaking young horses, nature of, and how performed in different cases, 144.
Broken knees, what to be done in cases of, 228.
Broken wind, nature, causes, and means of cure in, 198.
Breeding, male horses proper for, what the nature and properties of should be, 124.—Horses, principles and practices of and what necessary in, 130.—Construction and forms of different parts proper for, 131.—In the head, what necessary in the shape of, *ib.*—In the ears, what proper in regard to, 132.—In the eyes, different circumstances and matters relative to, *ib.*—In the necks, how they should be formed to the most advantage, 134.—In the shoulders, what proper to be attended to, *ib.*—In the body part, proper form of, 135.—In the legs, what is proper for, 136.—In the feet, proper form of greatly important, and should be well known, *ib.*—Methods of effecting which, 138.
Breeds, and sorts of, in this country, nature, state, and particulars of, 115.—Blood and race, nature, importance, and description of, *ib.*—On what the superiority of depends and has arisen from, 116.—Hunting, what now necessary in, and how may improve other sorts, make, and description of, 117.—Road, nature, make, and description of, 118.—Pony, small riding sorts of, *ib.*—Welch, description, nature, and use of, 119.—Scotch, nature of, what useful for, and particulars of, *ib.*—Shetland, what the nature of it is, and the description of, *ib.*—Fen, nature of, and make in, 120.—Cleveland-bay, nature of, the qualities of, and points in, 120.—Suffolk punch, nature, qualities, and marks of, 121.—Clydesdale, properties, nature and points of, *ib.*—Garron, circumstances of, 122.—Galloway, circumstances of, and what wanted in, *ib.*—Black dray, nature of, circumstances necessary to be regarded in raising of, and points of, 123.—Sorts of for wagons and teams, what required in, *ib.*
Canker, nature, and means of cure of, 228.
Cartilages, ossified in the feet, what the nature and cure of, 220.
Casting of, nature of, and how best performed, 169.
Catarrhal fever, circumstances of, and modes of cure in, what, 176.
Cervical bones, nature and description of, 254.
Cleaning of, what necessary and useful in, 161.
Coach, breed of, what the nature and uses of are, 120.
Colour of, kinds, and circumstances of, 129.
Compound ulcers, kinds of, and methods of cure in, 250.
Consumption, how it arises and is to be removed, 197.
Corns, nature and causes of, and how removed, 229.
Coughs, nature, and means of cure of, 196.
Crib-biting, state, nature, and circumstances of, and means of preventing and removing, 233.
Cropping ears of, what the nature of is, and how executed, 169.
Curbs, what is the nature of, and proper means of curing, 219.
Cutting of, nature and circumstances of the operation, 172.
Defects and injuries, different local nature of, 232.

Distemper in, nature of, and how caused and removed, 176.
Docking tails of, manner of executing the business in, what. 171.
Dung and urine, nature of, how made most useful, 271.
Ears of, cropping of, manner of performing, 169.
Ears, what necessary in the shape of, 132.
Examining of for purchase and sale, nature of, and what necessary in, 166.
Eyes, affections of, nature of the several kinds, 208.—Inflammation of, nature of the differences of, and their several means of cure, *ib.*
Eyes, what proper in the forms of, and the various circumstances to be regarded in, 132.
Farcy, nature of, how produced, and means of cure in, 202.
Fastening shoes on the feet, how performed in different cases, 157.
Feet, what the nature and proper form of should be, 136.
Fever common in, nature and means of cure of, 174.—Catarrhal, what is the nature of, and means of cure in, 176.
Firing legs of, what necessary to be regarded in, and how executed in different cases and circumstances of, 173.
Flesh of, what useful for, 270,
Foals, cutting of, when most proper, and weather most suitable for, 143.
Fore-legs, bones of, 255.
Foreign kinds of, nature of the several sorts of, in different parts, states, and kingdoms, 110—Qualities, properties, and uses of, in each, and how far beneficial or the contrary, 111.
Form, general in, what it should be, 137.
Frog, sensible, affection of, what the nature and means of cure in, 228.
Galls, harness, and saddle, what is the nature and means of cure of, 224.
Gelding of, how the operation of is performed, and what necessary in, 172.
Glanders, nature, circumstances, causes, and methods of treatment in, 179.
Grass-feeding, how useful in the summer season, 165.
Grease, what the nature of it is, circumstances to be regarded in, and methods of cure of in different cases, 204.
Gripes, nature and distinctions of, and modes of cure in, 190.
Gutta serena, nature of and how produced, 212.
Harness and saddle galls, what, 224.
Head, proper shape of, 131.
Heels, narrow contracted, what the nature and circumstances of, and the means of cure in, 225.
Hidebound, nature of, and how removed, 201.
Hide, hair, and hoofs, how useful. 271.
Hind extremities, bones of, 255.
Horse, nature, uses, character, and importance of, 108.—Foreign kinds, sorts of in different states and countries described, and the useful or contrary properties of in each, 111.—Breeds and sorts of in this country, nature, qualities and circumstances of, 115.—Sorts of from which all the different kinds are raised, 124.—For breeding from, what its nature, form, and qualities should be, 124.—Connected general form of, what it should be, 137.—Young, breaking of, how performed in different cases of, 144.—Importance of in different respects, 147.
Inflammation of the lungs in, nature of, how caused, circumstances of, and the means removing, 180.—Of the pleura, what the nature of, and means of cure in, 182.—Of the stomach, nature, causes, description, and methods of cure, 183.—Of the liver, how it happens, and the modes of cure, *ib.*—Of the kidneys, circumstances of, and means of relief in, 184.—Of the bladder, how produced, and the remedies proper for, 185.
Internal parts, nature of in each, 264.
Jaundice, nature, cause, and means of cure, 194.
Joints, stiff, nature of, and what to be done in, 219.
Keep, dry, for, nature and uses of in, 163.—Grass, state of, summer feeding with, use of, 165.—Summer soiling, nature of *ib.*
Kidneys, inflammation of, how caused, and the means to be used in, 184.
Lameness, different kinds of described, 213.—In the shoulder joint, nature of, and means of cure in, *ib.*—In the hip and stiple, nature of, and how cured, 214.—In the knee and other parts, nature of, and proper means of cure in, *ib.*
Lampas, what is the nature of it, and how removed, 212.
Legs, What the shape of should be, 136.—Fore, bones of, 255.—Hind, bones in, *ib.*
Liver, inflammation of, states of, how produced, and method of cure in, 183.
Local dropsy, nature and cure of, 199.
Lungs, Inflammation of, how removed, 180.—Chronic affections of, nature and cure of, 196.
Mallenders, what the nature of, 223.
Mange, what its nature is, and how to be removed, 201.
Mares, nature of, keeping of while in foal and afterwards, 139.—What necessary in choosing for producing good stock, 125.—When in the proper state for having young, 127.—Time of for taking the horse in different cases, *ib.*—Length of time of going with foal in, 128.—Signs of foaling in, what, 129.—Proper mode of keeping in while with foal, *ib.*—Improper practices used for after foaling, *ib.*
Methods of proper shoeing, how to be executed in different cases, 158.—Of managing horse-stock in raising, 159.
Military and tillage breed of, the nature and circumstances of, 123.
Muscles and moving powers, nature and structure of, 255.—Of head, nature of, *ib.*—Of neck, &c. 256.—Of humerus and cubit, 257.—In trunk, 258.—In right upper limb, 259.—In right lower limb, 260. In inner side of, 263.—In left upper limb, 264.
Nailing and securing shoes on the feet, the manner of in different cases, 137.
Names of, in particular cases of, 108.
Nastiness about, manner of removing of, what, 162.
Nature and effects of confinement, in raising horse-stock, 159.—Of food, feeding, foddering, and watering in, 160.—Formation and uses of parts of the horse, 253.
Neck, proper shape of, 34.—Bones of, 254.
Nicking, of, what necessary in the process, practices, and circumstances, 170.
Old Scotch breed of, nature of, 122.
Operations practised on, sorts of, 169.
Optic nerve, loss of power in, nature of, 212.
Origin of, from the wild sort of, 110.
Ossified cartilages in feet, state and cure of, 220.
Paralytic affections, what are the nature of, and the means of cure in, 188.
Pelvis, bones of, 255.
Pleura, inflammation of, how known and removed, 182.
Poll evil, what the nature and means of cure in, 206.
Pony, breed of, descriptions of, the nature, states, and uses of, in the several sorts of, 119.
Practices in the keeping and managing of mares, foals, and young horses, in general, 139.—Necessary in feeding and supporting, in different circumstances, 162.—By dry keep of various sorts, *ib.*—By green kinds of food, *ib.*
Principles and practices in breeding, nature of, 130.
Purchasing and disposing of, circumstances to be regarded in, 166.—Customs and practices in, 168.
Purposes to which use several parts of the horns are applied, 270.—Blood, *ib.*—Bones, 270.—Flesh, *ib.*—Hide, 271.—Hair, *ib.*—Hoofs, *ib.*—Dung and urine, *ib.*
Quittors, nature and rise of, and how cured, 231.
Rearing foals and young horses, nature and practices of, in different cases, 141.
Removing nastiness about horses, what the nature of, 162.
Ring Bones, how formed and removed, 222.
Roring and diseased respiration, what the nature, and the means of cure in, 232.
Rupture, nature of, and how removed, 234.
Scours, large, nature and description of, and what proper in the cure of, 192.
Shewing of, what to be regarded in, and nature of, 167.
Shoeing horses, nature, circumstances, and means of, considered, 152.—Manner and preparing the hoof for the shoe in the proper state of the foot, 153.
Shoeing, proper manner of in different cases of, 158.
Shoes proper for perfect hoofs, nature of, 154.—Suitable for altered and imperfect hoofs, 155.—Suitable for correcting and preventing faulty feet, nature of, *ib.*—Proper for heavy team horses, 156.—Fixing on the feet, modes and practice of, 157.
Shoulders, necessary forms of and proper positions for, 134.
Shoulder blades, nature of bones of, 254.
Sellanders, what, 223.
Simple ulcers, nature of, and modes of cure in, 249.
Sinuous ulcers in feet, how cured, 231.
Sit-fasts in the skin, nature and manner of cure of, 225.
Skin, under the knees, affections of, and how removed, 223.

Skin, abrasions of in different parts, how produced and removed, 225.
Small riding breed, what is the nature of in the several sorts, 118.
Soiling, summer, nature of, what necessary in, uses and advantages of, 165.
Sole round and pumied, states of, and what to be done in, 227.—Sensible, nature of, affections of, 229.
Spavin bog, what the nature of, and means of cure in, 217.—Blood, nature of, and cure in, *ib.*
Splents, nature, circumstances, and means of cure of, 220.
Stallions, nature of for raising stock, and means of providing them, 124.—Young, what necessary in raising of, 126.—Proper age of for propagation, *ib.*
Staggers, nature and distinctions of, and means of cure in, 187.
Staling, profuse, how caused, and means of cure in, 196.
Stings and bites, nature and means of removing of, 235.
Stomach, inflammation of, how produced, and means of cure in, 183.
Strangles, nature, state, and circumstances of, and how to be treated in the cure, 176.
Strangury, nature of, how it arises, and means of cure in, 195.
String-halt, nature and cure of, 216.
Strong blood breed, nature, description, and what necessary in, 117.
Substances, fleshy, nature and causes of, how removed, 234.
Surfeit, effects of, and means of cure in, 200.
Swelling in the breast, nature and signs of, and how to be removed, 186.
Tail nicking of, manner of, and what to be regarded in, 170.—Docking of, nature of, and how performed, 171.
Team horses, heavy, shoes suitable for, nature and kinds of, 156.
Teeth, wolf, state of, 234.—Cankerous state of, how known and removed in different cases, 235.
Teething in, nature, circumstances of, as shewing the age of, 109.
Thorax, bones of, nature of, 254.
Thorough pin, nature of, and cure in, 218.
Throwing of, manner of, and how to be done the most readily, 169.
Thrush, the nature and causes of, and the means of cure in, 288.
Tillage, English, breed of, the nature, properties, and description of, 121.—Scotch breed of, nature, qualities, and circumstances of, *ib.*
Training horses, nature of, 147.—In the blood kind, what yet to be done in, and manner of, *ib.*—In the hunting sort, how performed, and nature of, 148.—In road kind, how far requisite and proper, 149.—In light carriage and team sorts, the manner and nature of, 150.—In the dray and heavy team horses, how far necessary, and the nature and manner of performing it in, 151.
Twitching and tying, nature of, and means used in, 172.
Ulcers, fistular, in withers, circumstances of, and how to be cured, 207.—Different kinds of, 249.—Simple, nature of and means of cure in, 250.—Compound, nature and sorts of, and modes of cure in each, 251.
Urine, suppression of, how produced and cured, 195.
Urine and dung, nature and uses of, 271.
Viscera, different, nature of, 264.—Of all the several parts, 265.
Vives, how caused, and the means of cure in, 178.
Waggon breed of, what necessary in, 123.
Water in the chest, how caused and removed, 199.—Farcy, the nature and circumstances of, and means of cure in the disease, *ib.*
Weaning foals, means of, what necessary in, 140.
Wens, nature of, how removed, 234.
Wind broken, nature, circumstances, and modes of relief in, 198.
Windgalls, nature and circumstances of, and what proper in the cure of, 218.
Withers, ulcers in, nature of, and how cured, 207.
Wolf teeth, nature of, what, 234.
Worms in the stomach and bowels, nature of, how produced, and what necessary in the removal of, 193.
Wounds, nature and distinction of, 336.—Superficial, nature and circumstances of, and how cured, 237.—Contused, nature and states of, and how to be remedied, 240.—Punctured states of, and how to be treated, 242.—Gunshot, nature and modes of cure in, 246.—From burns and scalds, what the nature of, and how to be treated in the cure, 248.—Of long standing, what the nature of, 249.
Yellows, how caused, and the means of the removal of, 194.

ASS.

Appellatives of, what, 272.
Application of the different parts of, 274.
Bones, uses of, 274.
Breeding, manner of, 273.
Breaking and training, how best performed, 273.
Breeds, races, and kinds, what they are, 272.
Description of, 272.
Diseases in, nature of, 274.
Dung, how to be used, 275.
Flesh of, proper use of, 274.
Hoofs, purposes used for, 274.
Maturity of, what, 273.
Manner of raising in, 272.
Milk of, benefits and uses of, 274.
Names usual of young, 274.
Nature, habits, and uses of, 272.
Origin of, nature and manner of, 272.
Races or kinds of, 272.
Rearing of, how best effected, 273.
Skin, what useful for, 274.
Teething, nature and manner of, 272.
Uses of, nature of, and for what proper, 273.
Weaning of, how and when performed, 273.

MULE.

Appellatives of, what, 275.
Applications of the several parts of, 277.
Breaking and training, what needful in, 276.
Breeds and breeding, nature and manner of, 275.
Diseases of, their nature and kinds, 277.
Manner of raising and managing, 275.
Nature, circumstances, habits, and uses of, 276.
Rearing, manner of, 276.
Uses of, when beneficial, 276.
Usual names, what, 275.

SWINE.

Accidents in from poisons, how caused and removed, 330.
Advantages and uses of, 277.
African or Cape sort, 280.
Appellatives of, what, 279.
Application of dung of, most proper manner of, 337.
Bacon, modes of curing in different cases and circumstances of, 332.
Bites and stings, nature of and cure in, 330.
Boar or male, what necessary to be regarded in providing of as stock, 298.
Bowel complaints, nature of, and how removed, 329.
Breeding, what to be regarded in the several points and parts of, *ib.*—In head and eye, 295.—Snout and ears, *ib.*—Neck and shoulders, 296.—Body and twist, *ib.*—Thighs and legs, *ib.*—Hoofs and coat, 297.—Skin, *ib.*—For distillery use, *ib.*—Means of procuring proper forms and qualities in, *ib.*—*Boar* or male, what necessary to be regarded in providing of as stock, 298.
Breeds of foreign, different kinds of, 280.—African or Cape, nature, habits, and qualities of, *ib.*—Bosnian nature and properties of, 282.—Batavian, sort of, *ib.*—Ethiopian, nature of and where found, 281.—Guinea, qualities of, *ib.*—Mexican, description and nature of, *ib.*—Portugal, sort of, 282.—Domestic, of this country very numerous in the small and large kinds, *ib.*—Chinese, in the small sorts distinguished, properties and uses of in the white, black, mixed, and blue or sandy sorts, 283.—Norfolk, nature of and

where met with, 285.—Suffolk, nature and sort of, *ib.*—Kentish, what the nature of, 286.—Essex and half-black Essex, properties and kinds of, *ib.*—Sussex, nature and qualities of, and where found the best, *ib.*—Devonshire, nature of and how useful, 287.—White English, what useful for, *ib.*—Swing-tailed, qualities of, *ib.*—Scotch, what particular in, *ib.*—Berkshire, in the large sorts, nature, description, properties, and uses of, 288.—Hampshire, nature, description of, and valuable uses of, 289.—Shropshire, nature of and what beneficial for, *ib.*—Gloucestershire, distinction of and purposes useful for, 290.—Herefordshire, nature of, and what good for, *ib.* Wiltshire, how formed, and what useful for, *ib.*—Northamptonshire, what purposes proper for, 291.—Leicestershire and Lincolnshire, properties and uses of, *ib.*—Yorkshire, kinds of, and how found useful, *ib.*—Warwickshire and Worcestershire sorts, nature of, and for what proper, 292.—Oxfordshire, nature of, and where beneficial, *ib.*—Cheshire, large in size, and valuable for some purposes, *ib.*—Rudgewick, where found, and excellence of, 293.—Woburn spotted, a valuable sort, *ib.*—Irish, description and properties of, *ib.*—Mixed, what the nature and uses of, 294.

Bristles and hair, how useful, 337.

Cases, pig, uses of in fattening hogs, 316.

Castrating and spaying pigs, nature and uses of, and how performed, 301.

Catarrhal fever, causes and nature of, and cure in, 326.

Circumstances and character of hogs, what, 277.

Cisterns, hog, nature, and proper kinds of, 324.

Diseases of hogs, nature of, what, 326.

Distemper in, nature of, and means of cure in, *ib.*

Drying and salting hams, manner of, 335.

Dung, nature and proper uses of, 337.

Early suckling of young pigs, circumstances of, 299.

Farrowing or producing young in, nature of, and what to be attended to in, 299.—Seasons most suitable for, 301.

Fattening hogs, means of in different cases, 312.—By ground oats and other grain, *ib.*—By pea and bean meal, 313.—By malted barley, 314.—By acorns and beach mast, *ib.*—By potatoes and carrots, *ib.*—By dairy food and wash, *ib.*—By the refuse of starch-works and mills, 315.—By distillers' wash, and other matters, *ib.*—Methods of giving the food in, 318.—Sties proper for, 322.—Troughs fit for such uses, 323.

Feeding houses, nature and form of, proper for, 320.

Fold yards, *&c.*, hogs in, how far proper, 325.

Complaints, bowel, how produced and cured, 329.

Garget, how caused, and the means of cure in, 329.

Glands of throat inflamed, how removed, 328.

Hair and bristles of, uses of, 337.

Hams, salting and drying of, how performed, 335.

Hog-cisterns, kinds proper for, 324.

Hog's-lard, nature, uses, and properties of, 336.

Hogs, store-keeping of, how best performed, 333.

Houses, feeding, proper sort of for, 320.

Indigestion, how caused and cured, 328.

Inflammation of lungs, nature, causes, and cure of, 327.—Glandular, in throat, nature of, and how cured, 328.

Keep, weight gained by different sorts of, 302. 317.

Lard-hogs, nature and uses of, 336.

Length of time in fattening hogs, what, 319.

Live and dead weight, statements of in different cases and sorts, *ib.*

Loss of appetite, nature and cure of, 328.

Mange, nature and circumstances of, and cure in, 329.

Measles in, nature of, and cure in, 328.

Meat, weight of, given by different sorts of food in the fattening process, 317.

Narcotics, uses of in the fattening process, 319.

Nature, habits, and benefits of, 277.

Origin of, from what, 279.

Parts of hogs, uses to which applied, 331.—Flesh of, to pork, pickled pork, bacon, hams, tongues, *&c.*, *ib.*

Pig-cases, use of in fattening hogs, 316.

Poisons, accidents from, nature of, and how removed, 330.

Preparation of bacon in the cure of, 332.

Quinsey in, nature and means of cure in, 328.

Rearing and weaning pigs, what proper in, 302.

Reptiles, &c., bites and stings of, their nature and means of cure, 330.

Rind, nature of, 336.

Ringing of, nature and manner of, 302.

Rooting earth, preventing of, *ib.*

Salting and drying hams, 335.

Scab, what is its nature, and means of cure, 329.

Seasons most favourable for producing young, 301.

Skin, or rind, nature and uses of, 336.—Red eruption on, how removed, 328.

Sores behind ears, means of cure for, 330.

Sow, or female, what to be regarded in providing of, 299.

Spaying, nature and means of performing the operation, 301.

Staggers in, nature of and cure in, 328.

Sties and yards proper for feeding and fattening hogs and pigs, 320.

Stings and bites, how caused and cured, 330.

Store-feeding, proper means of, 303.—With pea-soup, oats, and dry keep, 304.—With wash and some sorts of mealy matters, 305.—By the soiling practice, 306.—By coarse sour grass, *ib.*—By Swedish turnip and sunflower-seed, 307.—By hay-tea and thickened wash, 308.—By pollard and wash, *&c.*, 310.—By potatoes alone, and in the state of wash, 311.—By brewer's grains, *ib.*—By lettuces, *ib.*—Expenses of, in different cases, 312.

Suckling young pigs, what proper in, 299.

Swaling practice of making bacon, 335.

Swellings in udders, nature and means of removing of, 330.

Teething, nature and manner of, 279.

Throat, glands of, inflammation of, how to be removed, 328.

Time, length of in fattening of, 319.

Troughs, feeding and fattening sorts suitable for, 323.

Utility or not explained, of hogs in folding-yards, *&c.*, 325.

Use of narcotics in feeding hogs, 319.

Vermin in, how to be destroyed and removed, 330.

Weaning and rearing pigs, nature and time of, 302.

Weight of pork produced by different kinds of food in fattening hogs, what, 317.

Yards and sties, proper, for keeping and fattening hogs, 320.

RABBITS.

Appellatives of, what, 339.

Breeding, and rearing the young in the different rabbit kinds of this country, 345.—Manner of in the wild sort, *ib.*—Proper means of keeping and feeding in, 346.—Training the tame sort. 347.—In the hutch or house manner, 348.—In the ornamental method, 349.

Breeds of, foreign and domestic, what, 339.—Foreign sorts of, *&c.*, *ib.*—Angora, nature and properties of, *ib.*—Hooded, qualities and nature of, *ib.*—And sorts of this country, how different in the wild and tame kinds, 340.—Common, nature, sorts, and circumstances of, *ib.*—Black, tame kind, properties of, *ib.*—White, tame, qualities of, *ib.*—Pied, domestic sort, nature of, *ib.*—Silver-haired, tame sort, what the properties of are, 341.—General qualities of the whole, *ib.*

Coat or skin, uses of, 360.

Cutting rabbit skins, nature and manner of, 366.

Descent of, how produced, 338.

Diseases of kinds of, in the wild and tame sorts, 359.

Dung, proper application and uses of, 361.

Enclosures for rabbit-warrens, proper sorts of lands for, 341.

Enemies of wild rabbits, kinds of, 352.

Expenses and profits of rabbits, 357.—In the wild kind, *ib.*—In the tame sort, 358.

Feeding and keeping, proper means of for the wild sort, 346.—And fattening, proper methods of, for same kinds, 350.

Ferret for rabbit-warrens, nature and breed of, 355.

Flesh of rabbits, value of as food, 365.

Forming and stocking rabbit warrens, manner and nature of, 341.—Particulars to be attended to in, 343.

Hutch and house manner of raising tame rabbits, 348.

Inflammation, scabby nature of, and means of cure, 360.

Keeping, feeding, and fattening, tame rabbits, proper methods of, 350.

Killing rabbits, proper season for, 356.—And selling them and the skins, 357.
Lands proper for warrens, in raising and keeping the wild kinds, 341.
Local dropsy in, nature and cure of, 359.
Longevity and fecundity of, what, 338.
Megrims in tame rabbits, nature and causes of, 359.
Names of, commonly used, 339.
Nature, character, age, and habits of, what, 338.
Nets, fold, for taking rabbits, 353.—Spring for, 355.
Origin of, what, 339.
Ornamental manner of breeding and raising tame rabbits, 349.
Parts of rabbits, how applied and used, 360.—Flesh, value of as food, *ib.*
Profits and expenses of rabbits, 357.—In the wild sorts, *ib.*—In the tame kinds, 358.
Purging in, nature and cure of, *ib.*
Rabbits, nature, uses, habits, and kinds of, 338.—Season of killing, 356.
Rabbit-warrens, proper modes of managing, for raising the wild sorts, 351.
Rot, in wild sort, nature and means of cure in, 359.
Scour, nature and causes of, and how removed, 358.
Skin, uses of, 361.
Skins, cutting and securing of, 356.
Spring-nets for taking of, 355.
Stocking and forming rabbit-warren enclosures, nature and manner of, 341.—Particulars necessary to in, 344.
Taking and killing, methods of, 352.—By tipes or tipping, and by fold nets, 353.
Tame and wild kinds, how they are various, 340.
Traps for taking of, 352.
Ulceration, scabby inflammatory, nature, and cure of, 360.
Uses and kinds of, 338.
Usual names of, 339.
Warrens, lands proper for, in keeping the wild sorts, 341.
Wild and tame sort, differences of, 340.
Wild, proper modes of feeding and keeping, 346.
Wild rabbits, proper modes of managing in raising in warrens, 351.—Destructive enemies of, 352.

DOGS.

Acute coughs, what their nature and cure, 380.
Advantages and benefits of, 368.
Affections, gripy and colicky, nature, causes, and cure of, 380.
Appellatives of, what, 363.
Asthma, canine, what, and how removed, 380.
Benefits of useful dogs, 368.
Blindness, how produced, 382.
Breeding, and rearing, and raising them for use, 638.
Breeds, useful kinds of, 364.—Shepherds, nature, uses, and qualities of, 364.—Cur, properties and uses of, 365.—Bull, nature and uses of, 366.—Mastiff, qualities and uses of, *ib.*—Dalmatian, what its use, *ib.*—Terrier, description and nature of, 367.—Newfoundland, how useful, *ib.*—Large rough water, for what beneficial, *ib.*
Canine rabies, what its nature is, 374.
Catarrhal affections, what the nature and cure of, are, 371.
Chronic coughs, nature and cure of, 380.
Circumstances and character of, 362.
Convulsive fits, how produced and cured, 381.
Descent of, how produced, 363.
Diseases of dogs, what is the general nature of, 371.
Distemper, what its nature is, *ib.*
Dog, uses to which its several parts are applied, 384.
Dogs useful, fitting them for their particular purposes, 368.
Eyes, sore, nature and causes of, and cure in, 382.
Fitting dogs for their particular uses, 368.
Hardnesses, schirrous, nature and cure of, 378.
High fever, with inflammation of lungs, nature and causes of, 378.
Inflammation of the lungs, nature of, 378.—Of the bowels, nature of, and means of cure in, *ib.*
Inflammatory fever, causes and nature of, 374.
Local affection of lungs, nature, causes, and cure of, 380.
Lungs, asthmatic affection of, how caused and cured, *ib.*
Madness in dogs, causes, nature, and distinctions of, 374.
Mange in, nature, causes, and means of cure in, 383.
Names, usual, of, 363.
Nature, habits, character, and uses of, 362.
Origin of, what the nature of, 363.
Ophthalmia, scrophulous, nature of and cure in, 382.
Parts of the dog, uses to which applied, 384.—Flesh of, how useful, *ib.*—Small guts, for what beneficial, *ib.*—Hair and skin, benefits of, *ib.*—Dung, purposes used for, 385.
Rearing young dogs, 368.
Scab, the nature, cause, and cure, of, 383.
Schirrous, hard states of parts, nature and removal of, 382.
Sore eyes, nature and cure of, *ib.*
Spasmodic fits in, how caused and cured, 381.
Strong fever, with inflammation, of bowels, nature, causes, and cure of, 378.
Teething, nature and manner of, 363.
Training young dogs, manner of, 369.
Use of, what, 369.
Uses of parts of dogs, what, 384.
Ulcerations, schirrous, of parts, nature and cure of, 382.
Worming, absurdity of the practice of, 384.
Worms, states of in, and the means of removal, 379.
Young dogs, manner of rearing of, 368.—modes of training of, 369.

POULTRY.

Abscess on rump, nature, causes, and cure in, 440.
Affection, low febrile, nature and cure of, 438.
Affections of the eyes, what the nature of, 489.
Appellatives of in the swan, goose, and duck, what, 386.—In the bustard, the turkey, the pea-fowl, the pheasant, and the guinea-hen, 387.
Aquatic fowls and birds, nature and habits of, 392.
Bites on head, cure in, 440.
Blindness, nature and removal of, 439.
Breeds and kinds of poultry—see the different heads of, 409.
Bustard, nature and circumstances of, 408.—Manner of laying, sitting, and hatching, *ib.*—Modes of feeding and rearing the young produce, 409.—Methods of fattening the young birds, *ib.*
Capons, cutting and fattening of, how effected, 434.
Catarrh or cold, nature of in, 437.
Chip in chicks, nature and cure of, 438.
Cocks' spurs, cutting of, 440.
Constipation in, nature and means of cure of, 489.
Crampy spasm in ducklings, nature and cure of, 438.
Crop, obstructions of, removal of, 440.
Diseases, general nature of, 437.
Duck, nature, habits, and particulars of, 399.—Breeds and kinds of, *ib.*—Laying, sitting, and hatching, circumstances of, 400.—Methods of feeding and rearing young of, 404.—Means of fattening when grown, *ib.*—Food, and increase in weight by, statements of, 405.—Live to dead weight in, *ib.*—Bone to meat in, *ib.*—Expense and profit of, *ib.*—Wild, decoys for, *ib.*
Dung of poultry, how used, 443.
Eggs, nature and value of, 441.—Keeping of, nature of, *ib.*
Eyes, affections of, nature and use of, 439.
Feathers and down, nature and manner of providing of, 441.
Filthiness, from vermin in, nature and removal of, 440.
Flux in fowls, nature and cure of, 439.
Gallinaceous fowls and birds, the cock and hen, 422.—Nature and habits of, *ib.*—Their several breeds and sorts, *ib.*—Means of choosing proper breeding-stock in, 425.—Proper methods of raising, feeding, and fattening, produce of, in such sorts, *ib.*—Laying, sitting, and hatching, nature of, 428.—Young chicks, rearing and raising of, what necessary in, *ib.*—Feeding and fattening grown chickens and fowls, nature of, 431.—Cramming, what the means used

in, 433.—Making capons, what necessary in, 434.—Keeping store-stock of, manner of, 435.
Geese, Gargle in, what, 438.
Glandular tumours on rump, nature and cure of, 440.
Goose dung, why useful, 443.
Goose, nature and habits of, 393.—Breeds and kinds of, *ib.*—Manner of laying, sitting, and hatching, 394.—Proper means of feeding and rearing the young produce, 396.—Fattening them when fully grown, 397.—Food, and increase in weight by, statements of, 398.—Live and dead weight in, *ib.*—Quantity of bone to meat in, *ib.*—Expenses and profits of, *ib.*—Muscovy, what, 399.
Granivorous, large fowls and birds, habits, nature, and breeds of, 407.
Guinea fowl, nature and circumstances of, 421.—Laying, sitting, and hatching, in, circumstances of, 422.—Rearing and fattening of young, how managed, *ib.*
Head, wounds, bites, and scratches, of, cure in, 440.
Houses and yards proper for keeping poultry stock, nature and kinds of, 338.—Heated and graduated, 339.
Living birds, of goose and other kinds, pulling feathers and down of, what proper in, 442.
Nature, habits, particular properties, and uses in, 385.
Obstructions in crop, nature and removal of, 440.
Origin of the several kinds, what, 386.—In the swan, the goose, and the duck, *ib.*—In the bustard, the turkey, the peacock, the pheasant, and the guinea-hen, 387.—In the hen kinds, 388.
Peacock or peafowl, beauty, nature, habits, and circumstances of, 415.—Varieties of, 416.—Laying, sitting, and hatching, nature and manner of, in, *ib.*—Rearing the young, proper in cases of, 417.
Pheasants, nature, habits, circumstances, and breeds or kinds of, 417.—Laying, sitting, and hatching, in, what is the nature and manner of, 418.—Rearing the young, what proper in, 419.
Poultry, houses and yards proper for raising and keeping, 388.—Grown, means of fattening, 421.—Proper use of dung of, 443. Packing up of, dead, improper, *ib.*
Poultry-stock, store, best modes of keeping, 435.—Products of, nature, provision, preservation, and uses of, 440.
Pulling feathers and down of living birds of different kinds, nature and manner of, 442.
Restricted bowels of, causes and cure in, 489.
Roup, what its nature is, and means of cure in, 437.
Rump, glandular swelling in, 440.
Scour in poultry, causes, nature, and cure of, 439.
Scratches on heads, cure in, 440.
Spurs, cocks, cutting of, 440.
Stock, store poultry, nature and best means of keeping of, 435.
Swan, nature of, and manner of laying, sitting, and hatching, in, 392.—Feeding and rearing young of, *ib.*—Fattening the young produce of, 393.—Goose, nature of, 399.
Swellings, glandular on rump, nature and cure of, 440.
Turkey, nature, habits, breeds, kinds, and circumstances of, 409.—Laying, sitting, and hatching, in, nature and manner of, 410.—Rearing the young, best means of, 411.—Manner of fattening the grown birds, 414.—By cramming of, *ib.*—By stubble-feeding, *ib.*—Live and dead weight of, 415.
Vermin, filthiness from, means of removing of, 440.
Wild ducks, decoys for, nature and formation of, 405.
Wounds, bites, and scratches, cure of, 440.
Yards and houses best suited for raising and keeping all kinds of poultry in, 388.

PIGEONS.

Advantages and inconveniences of, 443.
Affections of skin, nature and cure of, 451.
Appellatives, usual, of, 444.
Breeds and kinds of, nature and uses of, *ib.*
Canker in, nature and cure of, 451.
Catarrh and common cold, nature and how removed, 450.
Character and uses of, 443.
Cleanness and management in keeping, necessity and manner of, 449.
Core, nature and cure of, 450.
Crop, stoppage in, how removed, *ib.*
Diseases of, general, what the nature of, 450.
Dung of, nature of, and how best used, 451.
Enlargements, bony, 451.
Feathers, nature and uses of, *ib.*
Fleshy and bony enlargements, *ib.*
Giddiness in, how cured, 450.
Glandular knobs, nature and remedies of, *ib.*
Hard small knobs, nature of, 450.
Houses proper for keeping of, nature of, 446.
Inconveniences and advantages of in keeping of, what, 443.
Keeping of, proper houses for, 443.
Manner of their laying, sitting, hatching, and raising their young, 448.
Modes of breeding, rearing, feeding, and managing of, 447.
Names, usual, of, 444.
Nature and beneficial kinds of, 443.
Origin of tame sorts, nature of, 444.
Pigeons, houses proper for keeping of, 446.
—Advantages and mischiefs of, *ib.*—Useful kinds of, *ib.*
Practice of objected to, improper grounds of, 445.
Products of, what, and how applied, 451.—Feathers, nature and use of, *ib.*
Scour in, nature and means of removal of, 450.
Skin, affections of, nature and means of removal of, 451.
Sores, cuting, nature and means of cure of, *ib.*
Stoppages in crop, how cured, *ib.*
Turn in, nature and cure of, 450.
Usual names of, what, 444.
Wounds on head of, how removed, 451.

BEES.

Advantages of keeping of, what, 475.
Bees, keeping of, benefits of, 475.—Enemies of, 474.
Bread, bee, nature and uses of, 466.—Sorts of, what, 454.—Situations proper for, 458.—Manner of their forming honey and wax, 462.—Uses and applications of products of, 476.—Diseases affecting of, 475.—Stings of, means of cure in, 476.
Changing hives, nature and uses of, 463.
Character, general, of, what the habits of, 453.
Circumstances of, particulars in, 467.
Clarifying honey, manner of, 477.
Combs, separating honey from, manner of 476.
Common bees, nature and habits of, 453.
Debility in, nature and means of cure of, 476.
Diseases affecting, general nature of, 475.
Drone bees, nature and uses of, 455.
Enemies of bee-stocks, what, 474.
Extracting and preparing the wax, 478.
Feeding of in winter, nature, manner, and necessity, of, 473.
Hives, best sorts of for, 455.—Changing of, manner of, 463.
Hiving of, nature and manner of, 462.
Honey, modes of separating of from combs, 476.—Manner in which collected, 465.—Different methods of taking of, nature of, 471.—Manner of clarifying and keeping of, 477.
Keeping of, benefits of, 475.—Manner of, 479.
Mead, nature and manner of preparing of, 478
Modes of taking the honey, proper means of, what, 471.—By storying, nature of, *ib.*—By deprivation in improved hive manner, *ib.*
Nature, habits, and economy of, 453.
Necessary attention to their swarms and swarming, what, 469.
Particulars in the nature of, 467.
Process in separating honey from the combs, 476.—In extracting and preparing the wax, 478.
Propolis, what the nature and uses of it are, 466.
Purging in, nature of, and how prevented, 475.
Queen-bees, nature, habits, use, and qualities of, 455.
Scour in, nature and means of cure of, 475.
Season, winter, nature and manner of feeding in, 473.
Situations proper for, what, 458.
Sorts of in hives, their nature, habits and use of, 453.—Queen, properties of, 455.—Drone, nature and use of, 455.—Working, nature, uses, and properties of, 457.
Stands, most useful kinds of, 451.
Stings of, means of cure of, 476.
Stock-bee, proper means of providing, 462.
Stocks, bee, enemies of, 474.
Swarms and swarming, what to be regarded in managing of, 468.—Use of improved hive in, 473.
Uses and applications of products of, 476.
Wax, extracting and preparing of, processes for, 478.
Weakness in, nature, and removal of, 476.
Winter season, necessity and manner of feeding in, 473.
Working-bees, what their nature and uses, 457.—Manner of in, 462.—For producing honey and wax, *ib.*

FISH.

Breeding and producing the young in the different kinds, nature and manner of, 486.
Culture proper for, nature and kinds of in, 479.
Feeding of in ponds and streams, proper means of, 493.
Fish, manner of producing different kinds of, 486.
Fisheries, formed by means of, 493.
Formation of ponds proper for, nature and manner of, 483.
Forms of, suitable for different sorts of fish, 484.
Kinds of, proper for, and utility of, for ponds and rivers, 492.
Laying oyster beds, nature and manner of, 491.
Methods of properly stocking ponds and waters, in different cases, 488.
Nature and circumstances of, 479.—And habits in the several kinds, 481.
Oyster fisheries, great importance of, 492.
Ponds, proper kinds of for the several sorts, 480.—Sorts, and modes of stocking for, 488.—water proper for, 483.—And stews, proper modes of feeding fish in, 493.
Raising of, in different kinds, nature of, 486.
Rivers, proper kinds of for, 480.
Stews and ponds, proper means of feeding fish in, 493.
Spawning oyster-beds, circumstances of, 491.
Stocking ponds and waters, nature of, and time for, in different cases of, 488.—And forming oyster-beds, nature and manner of, 491.
Times proper for stocking ponds, and waters, 488.
Waters suitable for fish, 487.—And ponds, proper stocking of, in different cases of, 488.
Young of fish, nature and kinds of, manner of, breeding of, 486.

LIST OF PLATES.

ORDER OF THE PLATES IN VOL. I.

	To face p.
PORTRAIT to face Title Page.	
PLATE on differences of stomachs	8
——— Improved midland long-horned breed	42
——— Improved Devon or middle-horned breed	47
——— Improved Sussex and Herefordshire varieties of middle-horned breed	50
——— Improved Durham short-horned breed	55
——— Skeleton of cow	97
——— Internal viscera of cow	120
——— raised and sunk Dairy Houses, *&c.*	198
——— the Herefordshire fat Ox	280
——— Improved Leicestershire and Lincolnshire breeds of Sheep	364
——— the South Down and Norfolk breeds of them	382
——— the Chiviot and Dorset breeds of	388
——— the Merino and Ryeland breeds	396
——— the modes of feeding and washing Sheep	450

ORDER OF THE PLATES IN VOL. II.

	To face p.
PLATE on Goats and Deer	88
——— blood or race and hunting breeds of Horses	116
——— light tillage and carriage Breeds	121
——— heavy team and tillage Breeds	123
——— Nicking and Docking, *&c.* *	169
——— perfect and diseased Eyes of the Horse	212
——— Explanation of diseased Legs of	217
——— Skeleton, or bony Structure of the Horse	254
——— moving Powers, or Muscles, of	264
——— different Viscera, or internal Parts, of	270
——— small and large Breeds of Swine	286
——— different valuable Breeds of	294
——— improved Hoggery, *&c.*	322
——— useful Breeds of Dogs	368
——— heated Poultry-house	392
——— Water-fowls and poultry	426
——— improved Pigeon-houses, *&c.*	446
——— Bee-hives and Stands	461
——— Fish pond and River	480

* In which the former of these operations, at Fig. 1, shows the manner in which the tail is held and kept up by pulleys and weights, after nicking; *a*, the cushion to which the straps *b* and *d* are fastened round the horse; *c*, *e*, *f*, the strap means by which the tail is held up over the pad.

Fig. 2. The pad, in which *a*, *b*, *c*, *d*, show the side parts *e*, *f*, *g*, the width and opening for the tail; *i*, *i*, the two hind side straps; *k*, *k*, the length of the middle one; *l*, *l*, the fillets for tying the tail down with. Fig. 3. *c*, *d*, *e*, *f*, show the manner in which the pad is fixed on at the root of the tail.

Fig. 4. A proper instrument for removing the tail, in the operation of docking. Fig. 5. The form of the straps to be put round about the legs for the hobbles, in casting horses to be cut. Fig. 6. The hobbles properly fixed on the legs. Fig. 7. The implements termed *clams*, employed in the above operation. Fig. 8. The *searing* iron applied to the ends of the cut vessels, after removing the parts. Fig. 9. The form of the *firing* iron. Figs. 10, 11, and 12, shew the different useful modes of drawing the lines in firing, in different cases.

THE END.

London: Printed by W. CLOWES, Northumberland-court, Strand.